

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

CHICAGO, OCTOBER, 1933

Purchases of Rails to Help Ballast Producers

PENT-UP DEMAND TO BE RELEASED

From present indications the demand of the railroads for gravel, stone and slag for ballast should show a decided increase in the near future. Some time ago the railroads purchased about 50,000 tons of rails in response to a plea from Federal Railroad Coordinator Eastman and indicated that they would also make considerable purchases of other equipment. Since then President Roosevelt entered into negotiations with steel manufacturers for a cut in prices in return for a bulk rail order of between 700,000 and 1,000,000 tons. In less than a week since this plan was announced orders for approximately 125,000 tons have been placed and all indications are that the plan will be carried out. As this issue goes to press the president has just verified reports that he also plans to lend the railroads public-works funds to buy new equipment.

Officers of the various important railroads hesitate to commit themselves on plans for the future but it is admitted that much of the track now in use should be scrapped and that the laying of new rail will also in most cases necessitate the use of additional ballast. As very little ballast has been purchased by the railroads in the past few years it is evident that there is a huge pent-up demand for this material and a resumption of buying on the part of the railroads will greatly improve conditions in the mineral-aggregates industries. Due to the late season it is evident that only a small part of the rail purchased under this program can be laid this season and the bulk of the ballast purchases will probably be made early in the spring.

H. R. Clarke, engineer, maintenance of way, Chicago, Burlington & Quincy Railroad, presented a clear picture of the extent to which railroads have neglected their track maintenance, in a paper which he presented at the convention of the National Sand & Gravel Ass'n. in Detroit last January. According to Mr. Clarke the railroads in the years 1925 to 1929 spent 22 per cent. of their revenue for maintenance work and in 1931 and 1932 only 16 per cent. Maintenance of way expenses

fell 50 per cent. during this period and ballast expenses even more. At that time Mr. Clarke predicted that even a small increase in railroad revenues would result in a greater increase in purchases. Both passenger and freight revenues have increased considerably since that time with only a slight increase in ballast purchases, so it is evident that these cannot much longer be deferred.

New Virginia Gravel Plant in Operation

★ The Shenandoah Sand & Gravel Corp., Staunton, Va., of which J. B. Murphy is president, has put into operation a new sand and gravel plant.

Virginia Silica Plant to Increase Capacity

The Virginia Glass Sand Corp., Winchester, Va., is building a concrete dam across a creek at its plant which will impound about 7,000,000 gal. of water. According to G. W. Hohanness, general manager of the company, the additional water will be required for a contemplated second unit of the plant which will have a capacity of 10 cars per day.

North Carolina Quartz Plant Is in Operation

★ The Southern Products and Silica Co., Lilesville, N. C., which was recently incorporated, has erected a grinding and screening plant which enables the company to market any desired grade of lump or pebble quartz or filter gravel. Officers of the company are: F. J. Cloud, president; C. W. Gilchrist, vice president; J. E. Hancock, secretary and treasurer.

★ The Douds Stone Co., Douds, Ia., has opened a new gravel plant near Farmington, Ia., with H. E. Milten in charge.

The Hardy Sand Co., Evansville, Ind., is building a new plant near Camden, Tenn., which will be put into operation soon. Guy C. Ader is in charge of operations.

Santa Cruz P. C. Co. to Make Ocean Shipments

MAKING \$1,000,000 IMPROVEMENTS

The Santa Cruz Portland Cement Co., Davenport, Cal., has decided to go ahead with the construction of a pier for ocean shipment of cement which has been contemplated for several years. This pier, which will be of all-steel construction, will extend about 2,500 ft. out into the Pacific Ocean and will allow direct loading of the cement from the plant on shore to deep-draft steamers through a compressed air transport system.

Soundings and surveys for this project have been completed and it is reported that construction will be begun early in October. Silos and warehouses will also be built and the total cost of this improvement is expected to approximate \$1,000,000. It is also rumored that a large steamer has been purchased by the company and that this will be converted into a self-loading boat.

The shore storage unit will consist of 12 silos with a total capacity of 100,000 bbl. Work will also be started soon on storage silos at Oakland and Stockton which will serve as distributing points for their surrounding territories.

Atlas Rock Co. Installs New Asphalt Equipment

★ The plant of the Atlas Rock Co., at Oakdale, Cal., was shut down for almost the entire month of August for repairs and the installation of new equipment. Among this equipment was a new drier which is being used in the manufacture of a bituminous paving mixture.

Small New Pennsylvania Plant Now in Operation

★ The new McGinnis quarry and plant of the Connellsville Blue-stone Co., near Connellsville, Pa., went into operation late in July. The plant has a capacity of 200 tons daily and its equipment includes two crushers.

★ Bengel & Son, 1709 Monte Vista St., Pasadena, Cal., are erecting a rock crushing plant in the Eaton Canyon Wash, in Los Angeles County.

Code Used as Threat Before U. S. Approval

WARNS AGAINST PORTABLE PLANT

Evidence of an attempt to make the tentative provisions of the proposed mineral-aggregates code operative before that code has received government approval comes from Indiana, where L. O. Schroeder of St. Pierre planned to open a quarry and to produce crushed stone with a portable plant. As the following letter shows, he was told that such action would constitute a violation of the code and was warned that the regional committee would take "such steps as may be necessary" to prevent his beginning operations.

Kankakee, Ill.
July 29, 1933.

Mr. L. O. Schroeder,
St. Pierre, Ind.
Dear Sir:

We have been informed that you are contemplating opening a stone quarry on the Bob Murray farm at the south edge of Mokence, Ill. We are, therefore, taking this opportunity of informing you of the code of fair competition drawn at the request of President Roosevelt at a joint meeting of the national associations of the crushed-stone, sand-and-gravel, and slag industries of the United States. This code was formulated and adopted by these industries in accordance with the requirements of the National Industrial Recovery Act and the code as adopted will be submitted at once to the President of the United States.

Article 6 of before-mentioned code is entitled Limitations on Plant Capacity and New Production and reads as follows:

"No new plant may be established or the producing capacity of an existing plant increased or a plant moved from one producing site to another without notice of such intent being given to and permission being granted by the regional committee of the region in which the new production capacities are proposed to be located. Upon receipt of such notice, the regional committee shall collect complete information concerning the existing producing capacity in that area. If this data discloses that such new production will result in further increasing the problems of overproduction in such area, the regional committee shall refuse to permit the increasing of capacity of any existing plant, or the construction of a new plant, or the movement of one plant to another producing site. In the event that it may become necessary to do so, the regional committee shall take such steps as may be necessary to enforce the decision."

We are giving you this information at this time so that you will make no investment in equipment at your new plant as we would by necessity be obligated to protest the opening and operating of this plant should any equipment or machinery be moved into the location.

We feel that you will appreciate our position in this matter and further feel sure that you are fully desirous of supporting the President of the United States and his National Industrial Recovery Act.

MIDWEST AGRICULTURAL LIMESTONE
INSTITUTE

G. A. Brown, Engr.-Secy.

Illinois Producer Moves and Combines Two Plants

★ The R. H. Eastwood Sand & Gravel Works, Grayville, Ill., has started work on the removal of its two plants near that city to the former site of the Penglase Sand & Gravel Co.,

which it bought several months ago at a bankruptcy sale. The new plant will use the equipment from the old plants and additional equipment may be purchased. According to R. M. Eastwood, manager of the company, the plant will be modern in every detail.

Canadian Plant Adds Hydrating Equipment

★ The firm of Purdy & Green, Ltd., Saint John, New Brunswick, manufacturers of lime since 1873, recently put into operation a new hydrating plant for the production of hydrated lime for commercial, industrial and agricultural purposes. The hydrator was designed and erected by Wm. J. Kuntz, president of the Lime Hydrate Plants Co., York, Pa., and was manufactured by the Stephens-Adamson Mfg. Co. of Belleville, Ont., Can.

McGrath to Build New Illinois Gravel Plant

The McGrath Sand & Gravel Co., Lincoln, Ill., operator of four large plants in Illinois, plans to build a new plant at Bloomington in the near future, according to T. E. McGrath, vice president of the company. The firm owns a 100-acre deposit just west of that city and has surveyed and tested it to determine its extent and quality. All preparatory work has been done including plans and specifications for buildings and machinery and arrangements have been made with the Alton railroad for the construction of a switch track.

No definite date has yet been set for starting this project but Mr. McGrath believes it will get under way early in the spring unless conditions warrant an earlier start. The plant will have a capacity of from 50 to 60 carloads of gravel daily. A request has already been filed with the Illinois rate commission for competitive freight rates on all railroads out of Bloomington.

Alabama Stone Producer Builds New Lime Plant

★ The Alabaster Lime Co., Siluria, Ala., has put into operation its new and modern lime plant at that location. This plant is an addition to the crushed stone plant which the company has operated for several years under the name of the Alabaster Stone Co. All grades of lime and limestone products are made.

★ The McCready-Rodgers Co., sand and gravel producers of Pittsburgh, Pa., have ordered five steel sand barges of 800-ton capacity each from the American Bridge Co.

★ The Calcite Quarry Corp., Myerstown, Pa., recently purchased a McLanahan & Stone Corp., Steel-strut crusher for secondary crushing of limestone.

States Paid \$955,000,000 for Highways in 1932

BULK CAME FROM MOTOR TAXES

State highway expenditures in 1932 amounted to \$955,446,000 according to information collected from state authorities by the Bureau of Public Roads, U. S. Department of Agriculture. Of this amount \$816,765,000 was expended for construction and maintenance of highways, interest on bonds and notes and miscellaneous expenses. These items represent the capital investment and current expenses on account of state highways. Other disbursements such as principal payments on bonds, transfers to local road authorities and obligations imposed by statute totaled \$138,681,000.

Maintenance of the state systems which include 358,210 miles of main highways, gave employment to from 130,000 to 160,000 men throughout the year. States surfaced 29,500 miles of road and more than 6,000 miles were graded. The direct employment furnished by this construction was 86,000 men in January. This rose to 215,000 in September and was 144,000 in December. For every man directly employed it is estimated that two others were indirectly employed in supplying and transporting materials and machinery.

Total funds available were \$1,173,576,000, consisting of a \$275,259,000 balance from the previous year, \$632,200,000 current revenue from state sources, \$161,467,000 federal and local contributions, and \$104,650,000 from the sale of bonds and notes. More than 90 per cent. of the current state revenue was derived from motor-vehicle fees and gasoline taxes.

Portable Belt Conveyors Bought for Hoover Dam

★ The Six Companies, Inc., contractors for Hoover Dam and operators of gravel and ready-mixed concrete plants at the damsite, recently purchased two 75-ft. portable belt conveyors made by the Northern Conveyor Co., Janesville, Wis. The sale was made by the Brown-Bevis Equipment Co., Los Angeles.

Michigan Cement Plant Is Sold and Scrapped

The plant of the Peerless Cement Corp., Union City, Mich., was recently sold to Morris Birnbaum, Wyandotte, Mich., who is now engaged in scrapping the machinery and equipment. The sale was consummated by W. C. Russel, receiver of the company.

★ J. F. Tilly of Marion, Va., has acquired a rock-crushing plant in Nemours, W. Va., and is spending about \$12,000 for new machinery.

National Industrial Recovery

Portable-Plant Owners Form Own Association

TO MEET OTHER OPERATORS

The National Assn. of Portable Stone, Sand & Gravel Producers held its first meeting in Washington on Sept. 14 and formulated a code which was submitted to the National Recovery Administration. Officers of the association are: F. O. Weaver, Iowa Falls, Ia., president; John H. Olcott, Washington, D. C., secretary and treasurer. Headquarters are at 618 Shoreham Bldg., Washington.

A second meeting was held in Chicago on Sept. 25 and was attended by representatives from 18 states. This meeting was called to organize producers in the states not represented at the first meeting and to select a committee of ten to represent this branch of the mineral-aggregates industries at a general meeting to be held in Washington on Oct. 6 in conjunction with representatives of the operators of permanent mineral-aggregates plants and of the National Recovery Administration. The purpose is to settle the differences of opinion between portable- and permanent-plant operators and to agree on a combined code which will meet with the approval of both classes of producers and of the government.

Code Is Submitted by New Asbestos Institute

The Asbestos Institute, which was organized several months ago, at that time presented a code of fair competition to the National Recovery Administration. The Institute is made up of five divisions comprising the principal groups of products as follows: asbestos paper and allied products; asbestos cement products; asbestos magnesia products; asbestos textile products, and brake lining.

Officers of the Asbestos Institute are: Lewis H. Brown, president of the Johns-Manville Corp., president; Bradley Dewey, president of the Multibestos Co., vice president; D. R. Weedon, general manager and treasurer of the Russell Mfg. Co., treasurer.

Indiana Portable Plant Operators Hold Meeting

The Indiana Assn. of Portable Sand & Gravel Producers held an organization meeting at the Claypool Hotel, Indianapolis, Ind., on Sept. 23. More than 45 operators from all parts of the state met to discuss the code for this industry and to elect officers. They are: Charles Rosenbarger, Indianapolis, president; Ralph Rogers,

Bloomington, vice president; L. M. Henderson, Indianapolis, secretary. These officers and Felix Dunn of Gosport were also named delegates to the meeting of the national association which was held in Chicago on Sept. 25.

NRA Consumers Advisory Board on Price Fixing

At a meeting of the Consumers Advisory Board of the National Recovery Administration held on Sept. 8, a policy was adopted in opposition to direct or indirect price fixing in all codes with the exception of a few "natural resource" industries where cut-throat competition has led to public disaster. Where price fixing is permitted the Board urged that responsibility for the reasonableness of the prices be fixed upon the Code Authority. Where codes bar selling below cost, the Board recommended that the public be enlightened on this cost. A plan for the checking of the reasonableness of price increases was also drawn up.

Machinery Manufacturers to Meet in Washington

A conference of official representatives of most of the principal machinery trade associations will meet behind closed doors at the Mayflower Hotel, Washington, D. C., on Oct. 5 to discuss recommendations to the Administration concerning the rehabilitation, under the N.R.A., of the capital goods industry. This will be the largest conference of machinery manufacturers ever held and will be presided over by John W. O'Leary of Chicago, president of the Machinery and Allied Products Institute. The necessity for this conference is evident from the fact that those present will represent the ranking employers of more than 180,000 skilled workers, the survivors of a highly-paid personnel which in normal times averaged over 400,000.

Some of the industrial organizations to be represented follow:

American Machinery & Parts Ass'n.
Associated Builders of Small Locomotives.
Ass'n of Conveyor & Material Preparation Equipment Mfrs.
Ass'n of Roller & Silent Chain Manufacturers.
Compressed Air Institute.
Concrete Mixer Manufacturers Institute.
Diamond Core Drill Ass'n.
Diesel Engine Manufacturers' Ass'n.
Hoist Builders Ass'n.
Hydraulic Institute.
Kilns Coolers and Dryers Ass'n.
Locomotive Crane Mfrs. Ass'n.
Mechanical Lubricator Ass'n.
Multiple V-Belt Drive Ass'n.
Nat'l Ass'n of Air Filter Mfrs.
Power Transmission Machinery Ass'n.
Pulverizing Machinery Equipment Ass'n.
Reduction Machinery Mfrs. Ass'n.
Rock & Ore Crusher Ass'n.
Scale & Balance Mfrs. Ass'n.

Over Half of Public Works Funds Allotted

LARGEST SHARE TO WEST COAST

Allocations of public works funds up to Oct. 1 total \$1,653,591,410, according to figures just released, or more than one-half of the total fund of \$3,000,000,000. An unofficial tabulation of these allocations shows that the various sections of the country have been awarded sums approximating their shares of the federal tax bills with the exception of the western states which have received about 23 per cent. of the awards to date although paying only about 8 per cent. of the tax bill.

Mississippi Cement Purchase Is Approved

The purchase of 1,000,000 bbl. of cement by the Mississippi Highway Dept. to be used in a highway construction program has been approved by the U. S. Bureau of Public Roads. The contracts for this cement had been made in June but had been held up for the government acceptance of the state program. The delivered prices under this contract range from \$2.34 to \$2.72 per bbl. which is 25 c. per bbl. less than present prices, making a saving for the state of about \$250,000. About half of this cement will come from plants in or near Birmingham, Ala., with other plants in Arkansas, Missouri and Tennessee sharing the remainder.

Georgia Highway Funds Released by Government

The state of Georgia's \$10,091,185 share of the \$400,000,000 for highway construction set up under the National Industrial Recovery Act was made available early in September after having been held up since July 1. Controversy within the state over the control of the state highway department caused the delay. Plans are being rushed so that they can be approved and put into operation at an early date.

Gypsum Code in Hands of Recovery Officials

The code of the gypsum industry of the United States has been approved by a majority of the industry and was presented to the National Recovery Administration on Sept. 23. A hearing on this code will probably be held early in October.

Treat Phosphate Rock by Simple New Method

ALL PHOSPHORUS IS AVAILABLE

A recent and relatively simple process by which chemists of the Department of Agriculture have removed fluorine from raw phosphate rock, leaving a product in which all phosphorus is available as plant food, was described to the American Chemical Society, meeting here.

The experiments have been conducted by the Bureau of Chemistry and Soils of the Department of Agriculture and the chemists are hopeful the process can be adapted commercially, resulting in cheaper phosphate fertilizers for farmers.

The new method, as described, is a radical departure from that now used to prepare superphosphate, the principal phosphate fertilizer manufactured in this country.

In the government experiments, raw phosphate rock was treated with water vapor and silica at a high temperature, thus driving off the fluorine. The phosphate rock is then ground so that it will pass through ordinary fertilizer distributing machinery.

New Stone Plant Makes Truck Shipments Only

★ H. H. Armstrong, superintendent of the Eldred Crushed Rock Co., Eldred, Ill., recently leased a rock deposit at Schutz Mills near Jacksonville and installed plant equipment. At present only truck shipments are being made.

Chicago Dealers Raise Building Material Prices

Leading material dealers in the city of Chicago on Sept. 1 made the first move in 5 years to obtain a fair margin on sales. Prices were revised upward from 10c to \$4.00 on the various items handled. Higher plant production costs and operation under the NRA are given as the main reasons for these advances. Cement prices are up 10c per bbl., lime is up \$3.00 per ton and mason's cement about \$4.00 per ton, with corresponding boosts for other materials.

The National Gypsum Co., Buffalo, N. Y., recently purchased the Macoustical Engineering Co., Cleveland, O. According to officers of the company this acquisition will enable them to participate in the growing demand for acoustical correction of large buildings, in which work gypsum plays an important part.

★ The Kimballton Lime Co., Shawsville, Va., recently installed a Blaw-Knox deduster.

Cowell Dust Suit Is Nearing its Conclusion

The plant of the Cowell Cement Co., Cowell, Cal., resumed operations on Sept. 18, putting about 200 men back to work. According to W. H. George, superintendent, the plant recently contracted to supply a large portion of the cement for the Oakland-San Francisco Bay bridge and will operate at capacity for some time.

The suit of ranchers in the Clayton Valley against the company claiming cement dust from the plant as a public nuisance will be speeded up by the recent appointment of W. H. Archer, engineer of San Francisco by the court as expert to investigate the operating methods and the dust conditions created by the plant. Attorneys for both sides agreed to his appointment. Court decision on the case will be held up until his report is made. Mr. Archer will also study the feasibility and cost of installing dust-collecting equipment in the plant.

★ A. J. Beste & Son, Philadelphia, Pa., recently built a new electric-driven suction dredge for the production of sand and gravel. A new Morris 6-in. type F manganese-steel heavy-duty dredge pump is used on this dredge.

Iowa Producer Closes Large Stone Contract

The Winterset Limestone Co., Winterset, Ia., has closed a contract with the Pennsylvania-Dixie Cement Corp., Des Moines, Ia., for its 1934 requirements of limestone rock, shale and screenings. This contract calls for about 200,000 tons of materials, according to Glenn Poarch, manager of the stone company, as compared to 103,000 tons shipped this year.

Aluminum Obtained From Clay by New Process

A new process for producing aluminum from pottery clay instead of bauxite has been patented by F. M. McClenahan, professor of physics and geology at Monmouth College, Monmouth, Ill. It is said that aluminum can be more cheaply produced by this method and that valuable byproducts are obtained.

California Talc Mine Nearing Completion

N. C. Amen has practically completed the preliminary development of a talc mine and plant near Lone, Cal. A 70-ft. shaft has been sunk and mining was expected to be started on a small scale by Oct. 1. The talc will be ground and sacked at the mine and trucked to Sacramento for distribution.

Pennsylvania Has New Rules on Aglime Sales

TO SELL ON BASIS OF QUALITY

Amendments to the state law regulating the sale of agricultural lime in Pennsylvania, made at the 1933 session of the General Assembly, will be effective September 1, according to the State Department of Agriculture. The important changes in the law are summarized by state officials as follows:

(1) Guarantees must be in terms of minimum percentage of calcium and magnesium oxides, excepting for burned lime where a statement of the total maximum per cent. contained of oxide of calcium and oxide of magnesium which are combined as carbonates, must be included. The fineness must also be shown if the material is in a ground or powdered form.

(2) The Secretary of Agriculture is specifically authorized to revoke any license where it is ascertained that the licensee has wilfully given false information in its statements relative to the liming material sold.

(3) The fee for registration ranges from five to twenty dollars, depending upon tonnage sales.

(4) Fees for the analysis of lime by the state have been increased from one to five dollars.

(5) The act does not apply to sales made at the quarry or pit in bulk when delivered to wagon or truck of the user if such deliveries do not exceed 100 tons per year.

It is believed that these amendments will make it possible for farmers to purchase lime on a quality basis and eliminate much of the guesswork that has existed in the past.

★ The Hein Bros. Basalt Rock Co. has been awarded contracts for a large quantity of crushed stone to be used in the construction of roads through Lassen Park, California. A crusher and other equipment is being installed near the job. This company also operates a large plant near Petaluma, Cal., and has recently taken over the agency for the products of the Mirabel Gravel Co. in that vicinity.

Santa Cruz Gets Golden Gate Cement Contract

Considerable controversy has arisen over the recent action of the board of directors of the Golden Gate bridge in approving the transfer of \$250,000 worth of cement contracts to the Santa Cruz Portland Cement Co., of which George T. Cameron, a bridge director, is president. Mr. Cameron did not vote. The Pacific Portland Cement Co. had been furnishing cement for the bridge. According to Prof. Charles Derleth of the University of California, chief consulting engineer on the Golden Gate bridge, this selection was made only after the board of engineers had decided after lengthy investigations that the silica cement manufactured by the Santa Cruz company was superior for withstanding the effects of salt air and salt water.

★ Leslie Fieleke has leased a large stone quarry in Momence, Ill., and has purchased machinery which will be in operation shortly.

A Century of Progress

Macwhyte Co. Explains Making of Wire Rope

The exhibit of the Macwhyte Co., Kenosha, Wis., is in Pavilion No. 1 in the General Exhibits Group. Mechanical illustrations and photographs show how wire rope is made. A row of small models show how the wire is drawn through three successive dies and how the wires are then led through holes in a large drum to holes in a smaller revolving drum that twists the wires into a rope. To make the finished rope the small ropes are then led through holes in a drum in the same manner as the individual



Macwhyte Co. exhibit shows how wire rope is made.

wires. These ropes are twisted around a hemp core to form the finished wire rope. The photographs show the wire rods being heat-treated and drawn to wire, testing, internal lubricating, etc. Samples of the finished products are also exhibited.

Alemite Has Action Exhibit of Lubrication

The Alemite Corp. exhibit in the Travel and Transport Bldg., is an action exhibit of lubrication. It features automobile lubrication in one section where a stock model of a popular car is raised at stated intervals on a hydraulic lift. An attendant lubricates all parts of the car, accompanied by a sound device which explains his movements, the types of lubricants used, and the types of equipment required.

A map of the United States on one of the walls shows the distribution of Alemite dealers and representatives throughout the country. Murals on the wall of this room also tell the story of the progress in perfecting lubricants.



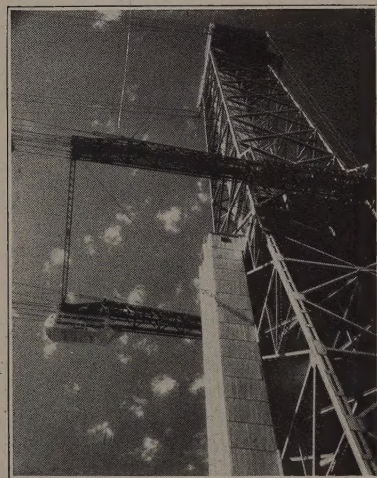
The beautiful building of the General Motors Corp. which houses a complete operating assembly plant. This exhibit is one of the most popular at the Exposition. In one section a complete line of trucks is on exhibition.

Sky Ride Is Feature of Century of Progress

The outstanding entertainment feature of the Century of Progress is the Sky Ride, which is to this exposition what the Eiffel Tower was to the Paris Exposition of 1889 and the Ferris Wheel to the World's Columbian Exposition of 1893. The 628-ft. steel towers of the Sky Ride, the tallest man-made structures west of

New York City, rise 1,850 ft. apart, spanning the lagoon between North-erly Island and the mainland. John A. Roebling's Sons steel cables connect the towers at the 210-ft. level and form an overhead track for observation cars suspended from trucks that run on the cables. At the top of each tower is a two-story observation platform.

The network of steel cables connecting the towers makes one of the world's longest suspension bridges with a span of 1,850 ft. Two sets of elevators take passengers to the car platforms and to the observation platforms. The ten rocket-shaped cars are drawn by an endless traction cable across the span.



The west tower of the Sky Ride viewed from below.



The building of the Chrysler Motors Corp. which houses a complete display of automobiles, trucks, industrial power units and accessories. A beautifully-landscaped park surrounds the building and at the right, just out of sight, is a proving ground and track where visitors are given a first-hand idea of the tests to which the cars are subjected.

Editorial

Some Problems Confronting the N. R. A.

IT has long been evident to acute observers that industries generally are overcrowded, that the policy of allowing industrial opportunity to become a free-for-all contest, in which any type of contestant may participate, has resulted in the admission to all lines of commercial endeavor of greater numbers of factors than the demand for their products would or could justify. We must not be astonished that this overcrowded condition has resulted; its coming was inevitable. Nor must we be astonished that such a policy of indifference to the known effects of known causes should have been allowed to operate; it is part and parcel of the modern idea of freedom of action and equality of opportunity. A society which tolerated indiscriminate breeding of human beings, despite the certain knowledge that large numbers of them would either starve or become public charges, is not likely to take a more intelligent view of the problem of industrial starvation or of the economic burden of commercial failure.

These conditions have, as we say, long been known. For a long time, too, corrective measures have been proposed, but these have generally been rejected or, at best, viewed with a natural skepticism as being man-made attempts to disrupt the workings of some sacrosanct economic law or natural right of men. The difficulties of the last few years, however, have made larger numbers of people aware of the incongruities of the situation. They have seen increasing hordes of commercial daredevils not only stub their toes but even crack their skulls in their determination to take part in a form of enterprise for which they had neither talent, skill, nor experience, and then rush to the public economic clinic for dressing of their wounds. While these observers have been willing, perhaps, to pay their share of the economic cost of repairing the self-inflicted damage of these selfish opportunists, they have become alarmed at the growing financial burden of repairing the damage inflicted at the same time on existing competitors and, through them, on the general economic structure.

The coming of the National Industrial Recovery Act and the submission of industrial codes under it seemed at last to offer the golden opportunity for giving effect to the newer principles of industrial control. Existing concerns in all industries were quick to see that here was the chance to exercise that check on overexpansion which obviously was so badly needed in the interest of society at large. Perhaps their perception was quickened by the discovery that by preventing the entrance of newcomers into their fields they could not alone render a service to the general good but that they could at the same time strengthen their own commercial po-

sition. But we must not view too sternly the possibility, nor even the reasonable certainty, that the latter consideration seemed the one of greatest importance to them. Self-preservation has always been deemed a proper and the primary consideration of physical life, so why not also of commercial life? As we have often said, no industrialist can view with unconcern the coming of new capital, the entrance of new producing factors, into his industry, when such new capital and new factors will inevitably increase the difficulties of his doing business on a profitable basis.

It was but to be expected, therefore, that in many of the codes of fair competition proposed by various industries, notably those covering the production of steel, lumber, mineral aggregates and cement, attempts should have been made to prevent further increase in the factors of production and in the existing facilities of production. These codes, it seemed, provided for the first time the machinery and the legal sanction necessary for effectually carrying out the principles of sound economic production control, exercised with the view of conserving the capital already invested in established industries and with the effect of furthering the general good. Naturally, therefore, the opportunity has been eagerly seized in the belief that a similar opportunity to accomplish the same desirable ends might not soon, if ever, recur and in the conviction that never again might the necessity for rigid industrial regimentation be so great or so evident.

TO none of these principles will any well-informed and intelligent man, we feel sure, offer objection. Certainly no one should be better aware of the need for economic planning and control than those who have been the victims of a situation that has become unbearable because of the lack of those qualities. And there is scarcely a producer in any line of industrial activity who has not felt the pinch of an overexpansion and an overproduction made doubly severe by the restricted selling opportunities of recent years or who has not longed to free himself from the distressing and disgusting competitive methods which these have engendered and so rapidly developed. The National Recovery Administration, we have no doubt, has listened with interest and sympathy to the pleas of different industries which have asked for the privilege and authority of setting limits on further economic development of their spheres of activity, and, we are equally certain, it has tried to reconcile the various economic interests that are inevitably brought into conflict by such appeals and at the same time watch the interests of the public, partic-

ularly as these lie in the direction of increasing the purchasing power of the nation.

Those who have opposed the granting to existing industrialists of the power to determine who shall and who shall not enter a given industry and who shall and who shall not increase his existing production facilities have based their opposition very largely on the feeling that the vested interests now composing any given industry are not competent to pass judgment on either question. It is certainly not to be expected that one who feels the pinch of overproduction or who fears the competition of a more efficient newcomer could view the prospect of new and probably more dangerous competition in anything but a self-interested light.

On the other hand, those who compose any given industry are equally reluctant to leave these questions to the determination of the newcomers. These, they rightly feel, have little or nothing to lose by being prevented from entering a field new to them, except, possibly, the moral setback which one experiences when he is denied the exercise of a privilege that he believes is his by natural right. Existing industrialists, being numerically in the majority and enjoying what are normally recognized as the rights of priority and vested interests, can not admit the right of a minority of late comers having no invested capital to jeopard those vested interests without giving some compensatory assurance that they will limit their activities according to the standards set up by the concerns already established.

MANUFACTURERS of what are known as capital goods—that is to say, goods which are used for the production of other goods—are greatly concerned about these requests for the power to prevent the creation of new production facilities and the enlargement of existing ones. They see a serious restriction of their own commercial opportunities as well as an attempt to check mechanical progress. Obviously, if it should become impossible—or so difficult as to render it practically impossible—to erect new plants, because of the approval of restrictive clauses in industrial codes, the manufacturers of production machinery and the designers and builders of new plants would have no market for their products or their services in industries operating under such codes. What is more, if clauses forbidding the enlargement of existing production facilities should be allowed to become operative, there would be no market for individual pieces of productive or processing machinery even for replacement purposes, because it is virtually impossible, in these days of higher machine efficiency, to replace an old unit with a new one without at the same time, and even without intent, increasing the production capacity of that phase of the operations. One of the greatest advantages of modern machines over obsolete equipment is their ability to deliver a greater ratio of product units to power units, and this advantage is almost invariably present, even in machines whose chief advantage is intended to be improved quality, rather than enhanced quantity,

of their products. It is extremely difficult to increase the efficiency of a plant without increasing its capacity as well, and in most cases it is impossible to do so.

THE interest of the consuming public, although seldom given consideration except in academic discussions, is of great importance, many will say of the greatest importance. The public is desirous of obtaining the greatest quantity of the highest quality of consumable goods at the lowest cost, and that certainly would be the aim of any economic system designed and operated to promote the general good. This end has been partially realized—although not by specific intent—through the operation of the type of unrestricted competition which we have known so long; indeed, this has been one of the most potent arguments offered in defense of the present order. Yet, probably no one intimately familiar with existing production facilities in any major industry would be willing to admit that those facilities are able to produce a class of product that meets these requirements. No industry, in fact, has yet availed itself of all the most efficient appliances obtainable. Speaking in terms of the mechanical efficiency of their products, machinery manufacturers are always many steps ahead of their customers, who buy more efficient equipment than their own only when they are compelled to do so by the pressure of more efficient competition. It is for this reason that no industry—not even the automotive industry, despite all its boasted progressiveness—utilizes the simplest processes or the most efficient equipment that have been devised and offered to it. Operating on the principle that no producing unit must be discarded until its entire useful life has been spent, it is natural for producers of all kinds to defer as long as possible the scrapping of obsolete equipment and the substitution of newer and better. Committed to this policy, they naturally view with alarm the advent of the newcomer, whose plant usually represents the latest developments of engineering skill and whose processes typify the most modern in directness and simplification. In seeking to prevent the building of new plants many industries are trying to prolong the useful life of their less efficient production facilities and, so, postpone the arrival of the time when the public's needs will be adequately served. That tendency runs counter not only to the general good but also to the interests of capital-goods manufacturers. It is opposed, too, to the best interests of existing industrialists, who would be only too ready to admit it if they could free themselves from the prejudices born of their habits and the weight of their invested capital.

So the N. R. A. faces the problem of reconciling these four types of interest—the investment in existing production facilities, the greater production efficiency of future investment, the investment in capital-goods manufacture, and the needs of the consuming public. The law under which it functions, by emphasizing the necessity for increasing employment, has definitely set up the general good as the chief objective.

Cement Code Meets Strong Opposition at Formal N. R. A. Hearing

Wages, Production Control, Price System and Dealer-Sale Exceptions Are Attacked

THE Cement Institute reached a climax of its efforts on Sept. 15, when the public hearing on the proposed Code of Fair Competition for the cement industry was held in the Caucus Room of the Senate Office Building in Washington. The work is not finished, however, for objections were raised to numerous sections of the code as presented to N.R.A. The American Federation of Labor objected to the labor provisions, a detailed capacity study was urged by several who testified, the basing-point price system and the provisions for production control were frowned upon by the Administration, and all dealers were up in arms against the threatened curtailment of their activities.

The Washington committee of the institute, the body directly responsible for the code, consists of Charles F. Conn, president of the Giant Portland Cement Co., as chairman; Blaine S. Smith, president of the Pennsylvania-Dixie Cement Corp., and L. T. Sunderland, president of the Ash Grove Lime & Portland Cement Co. Deputy Administrator Malcolm Muir was in charge of the hearing, but his assistant, Malcolm Pirnie, presided during most of the session. Frank H. Smith, president of the Lawrence Portland Cement Co. and a former president of the Portland Cement Assn., acted as technical advisor to the Deputy Administrator. Consumers' interests were represented by E. M. Tisdale, while E. C. Eckel, who is best known as the author of *Ce-*

ments, Limes, and Plasters, looked after the interests of the Labor Advisory Board.

After outlining the procedure to be followed at the hearing, Deputy Administrator Muir asked Mr. Conn to present the code, the actual reading of which was dispensed with. Mr. Conn's remarks were confined to a brief summary of the financial status of the cement industry. Of especial significance was his statement that the earnings of the domestic industry over the past 41½ years have amounted to only 0.6 per cent. on the invested capital.

Articles I and II were not questioned by anyone present at the hearing.

A. F. L. Opposes Labor Provisions.—Mr. Conn introduced the discussion on Article III by informing the Deputy Administrator that the cement industry voluntarily accepted the 36-hr. week and the wage rates of the code on Aug. 1. He reported that this action resulted in an increase of 55 per cent. over 1932 in the number of employees and in the total pay-rolls. John J. Porter also supported the labor provisions of the code and outlined the necessity for continuous operation in the cement industry, which in turn made flexibility of hours highly desirable.

The American Federation of Labor and affiliated unions, through their representative, David Kaplan, objected to the labor provisions of the code. Mr. Kaplan asked for a 30-hr. week with a maximum of



Formal hearing on cement code, Senate Office Building Caucus Room, Washington, September 15. N.R.A. officials at table in background (left to right beginning with third man): Industrial Advisor Smith, Deputy Administrator Muir, and Assistant Deputy Administrator Pirnie. At right end of table Labor Advisor Eckel and Consumers' Advisor Tisdale.

6 hr. in any one day. He objected also to the latitude allowed packing- and shipping-department employees. In modification of the provision for 936 hr. of work spread over half a calendar year, he suggested time-and-one-half-time pay for work in excess of a 40-hr. week or an 8-hr. day.

In previous codes relating to nonmetals production, the A. F. L. objected to a wide differential between wage rates in the North and the South but agreed to accept a 5-c. differential. Mr. Kaplan, however, asked specifically for a minimum wage of 50 c. an hr. with no differential. Later in the hearing, E. C. Eckel implied that a differential of 5 c. would meet with the approval of the Labor Advisory Board.

In support of his contention, Mr. Kaplan spoke at some length from reports of various economists and social workers. He quoted one authority who set \$33 a week as the minimum wage for an average family to maintain a decent living standard. Obviously, the wage rates of the code would not meet this minimum. Under the 40-c. rate in the North two wage earners would have to contribute to the family income, and three in the South. Mr. Kaplan also refused to admit any justification for believing that living costs in the South are lower than in the North.

Representation of labor on the code authority was requested by Mr. Kaplan and later seconded by E. C. Eckel and William M. Richardson.

The Federation of Architects, Engineers, and Technicians supported the A. F. L. in requesting a 30-hr. week. The federation also demanded definite provisions for the welfare of technical workers, asking specifically for a minimum rate of \$65 a week for technical employees, with the scale graded downward to \$30 a week for apprentices.

No discussion ensued on Articles IV, *Reports*, and V, *Safety Work*; while testimony on Article VI, *Distribution Through Dealers*, was deferred for consideration with the *Supplement*. Article VII, *Condition of the Industry*, likewise failed to develop opposition.

Control of Production and Distribution.—Opposition to the code centered around Article VIII. In a general statement for the Consumers' Advisory Board of N.R.A., E. M. Tisdale said that his board would not sanction any monopolistic tendencies. He objected, in behalf of consumers, to the provisions in the code which allowed allocation of production and which prohibited new productive capacity. Price stabilization also was frowned upon.

Article VIII was supported in its entirety by R. S. Weaver and S. W. Storey, who spoke in behalf of the institute. The Volunteer Portland Cement Co. also favored its provisions, but asked that a detailed capacity study of the industry be made by disinterested engineers as a basis for administration. An interesting question was raised in this connection: Whether the trend toward longer burning and finer grinding of cement should be considered in computing capacity.

W. J. Young, of the Standard Lime & Stone Co., could see no justification for the adoption of any

scheme for regulating production or distribution.

William M. Richardson had a logical cause for complaint. He is president of the National Portland Cement Co., the concern organized by Fred Franks to build a plant at Brodhead, near Bethlehem, Pa. Mr. Richardson explained that his company had not been invited to participate in the formulation of the code and humorously objected to being legislated out of business while his plant was being built.

The advisability of a capacity study was reiterated by the Santa Cruz Portland Cement Co. This problem was discussed informally during the noon recess, and the opinion was expressed that the Bureau of Mines' records probably could be used to advantage in this investigation.

E. C. Eckel discussed Article VIII from a labor viewpoint and stated that the Labor Advisory Board of N.R.A. would object strenuously to any arrangement whereby producing units would be permitted to consolidate, because obviously such procedure would result in reduced employment. He asked also that both government and labor be represented on the code authority.

Joseph S. Young, president of the Lehigh Portland Cement Co., ably summarized Article VIII from the institute's viewpoint. With the aid of statistics compiled by Price, Waterhouse & Co. he showed the need for stabilization of the industry. According to Mr. Young, the cement industry lost 10 c. a bbl. in 1931 and 33 c. in 1932. Without control of production and distribution as protection against the price-cutter, the industry is destined to continue in this deplorable situation, he pointed out.

Delivered Price System Attacked.—An interesting question in connection with Article IX was raised by Charles F. Lewis of the Volunteer Portland Cement Co. He felt that continuation of the alleged uniformity of all brands of cement might not be desirable and suggested the possibility of cements ranging in price on a basis of quality. Mr. Lewis also claimed that the mechanics of administration of Article IX should be elaborated to prevent any suppression of price-change information which might result to the benefit of the companies represented on the committee.

It is common knowledge that virtually all cement is shipped by railway. This is in striking contrast to the situation in the aggregates industries, wherein less than 50 per cent. is carried on Class I roads, and the percentage is steadily declining from year to year. The motor-truck and trailer interests apparently are greatly concerned over their inability to get business from cement manufacturers, and their representative accused the basing-point price system of discriminating against truckers.

After the luncheon recess Robert Kingery called the Cement Institute a "tyranny controlled by a powerful minority." It must be explained, however, that Mr. Kingery is acting chief of the State of Illinois Department of Public Works, and he was reading a message from Gov. Horner. Details of the governor's feud with the cement industry over identical bids already have been overpublicized. Of particular interest, however, was Mr. Kingery's state-

ment that cost studies made at the University of Illinois indicated that reasonable prices for cement at the time of the controversy should have been about \$1.32 rather than \$1.62, the price actually quoted. He specifically asked the Administration to insist that the cement industry adopt a system of prices, f.o.b. plant, rather than continue the prevailing delivered-price quotations.

Mr. Kingery questioned the logic of using the Bureau of Mines districts for the purposes of the code. These districts were set up for statistical purposes and bear little relation to the marketing problems of the industry. He admitted that price control may be desirable but suggested a system based upon uniform cost accounting.

Another Illinoisan, Assistant Chief Highway Engineer L. J. Deleuw, paid a tribute to cement in highway construction by stating that the cement industry logically deserves consideration as a "public utility." Mr. Deleuw related his experience during 1928, when his difficulty in procuring cement for highway jobs led him to hazard a guess that the industry in his section of the country must have been operating at more than 95 per cent. of its actual capacity.

The position of the institute in asking for continuation of the basing-point price system was supported by Joseph S. Young. Using a wall chart, he explained that the local market area in which the Lehigh district enjoys a lower or equal freight rate in comparison with outside competing plants absorbs only about one-tenth of the 48,000,000 bbl. of productive capacity. Whether the more advantageously located mills could supply the rest of the present marketing territory in a normal year is a subject for conjecture. This would be expected, however, under an f.o.b.-plant price system, although the natural tendency would be toward the creation of local monopolies in which each mill logically would keep the price just below the price-plus-freight of his nearest competitor. According to Mr. Young, adoption of f.o.b.-plant prices would cause widespread havoc in the Lehigh district, throwing thousands out of employment and causing capital losses in excess of \$87,000,000. Even in a Socialistic regime such a procedure would be undertaken with great caution.

Illinois presents a similar situation. Under f.o.b.-plant prices Illinois mills would supply only local areas around La Salle and Dixon. The rest of the state would be served by near plants in adjacent states. Certain counties would benefit by lower prices, but others might be subjected to higher prices because of longer hauls. The extent of the saving, if any, under an f.o.b.-plant price system would be small, according to Mr. Young.

The people of Illinois also should be interested in knowing that Gov. Horner's recommendation for f.o.b.-plant prices would cause more than three-fourths of the business to go out of the state.

Dealers Present United Front.—Literally hundreds of dealers objected to Article VI and the Supplement, in which many exceptions to sales through dealers were recognized. Only a few of the com-

plaints were heard individually, Acting Deputy Pirnie having recommended that the dealers organize a committee to meet with the code committee in an effort to arrive at a compromise.

The institute, on the other hand, received support for its modified dealer policy. Harry Kirk of the Associated General Contractors of America outlined the common practice of buying cement through local dealers for all jobs. The dealer receives 10 c. a barrel on this cement even though it may be ordered by the contractor and shipped from this mill direct to the job, the dealer seeing only the invoice. Mr. Kirk recommended that the dealer be compensated only when he actually renders service in connection with the sale.

Identical views were expressed by the spokesmen for the concrete-products industry. Einar Christensen represented cinder-unit plants and Benjamin Wilk, the Concrete Masonry Assn. Mr. Wilk asked to be shown the logic in a situation where a dealer receives 10 c. a bbl. for cement shipped direct from the mill to the products plant. He stated that this system has resulted in the products manufacturer going into the building-materials business in order to avoid paying \$2,000 to \$2,500 a year in cement commissions to the established dealer. He mentioned the keen competition of concrete units with clay products and stated that the financial success of any plan depends upon strict economy of operation. Dealers, of course, would continue to supply small concrete-products manufacturers.

Acting Deputy Pirnie recommended that Messrs. Kirk, Christensen, and Wilk meet as a committee with the dealers' committee and discuss their differences of opinion. Mr. Conn volunteered the suggestion that any agreement they might reach would be acceptable to the code committee, but hastened to add that he and his associates would be glad to render any assistance possible.

After stating that the hearing might be reconvened upon the call of the Administrator, Mr. Pirnie declared the session adjourned. The work of adjusting differences now begins, and humors emanating from the corridors of N. R. A. indicate that the job may require several weeks.

The code, as submitted at the hearing, is reproduced below.

BASIC CODE OF FAIR COMPETITION SUBMITTED BY THE CEMENT INSTITUTE PRELIMINARY STATEMENT

The Cement Institute is the trade association of manufacturers of Portland cement in the United States, organized Aug. 20, 1929. Its control and management are vested in a Board of Trustees elected from its membership. A copy of its articles of association, describing its purposes, scope, and operation, will be submitted if desired. A list¹ of members of the Cement Institute is annexed hereto and marked Exhibit A.

The Institute includes 96 per cent. in number and 98 per cent. of the producing capacity of all Portland-cement producers in the United States, and is authorized to represent the industry under the National Industrial Recovery Act, the policy and purposes of which are set out in Sec. I, Title I thereof.

¹ On account of lack of space, this list is not reproduced here.
—ED.

To effectuate the policy and purposes of the above title during the period of the emergency, by reducing unemployment, improving standards of labor, eliminating unfair and destructive competitive practices inimical to the interests of the public, employees, and employers, relieving the disastrous effects of overproduction and excess capacity, and otherwise rehabilitating the Portland-cement industry and, by thus enhancing purchasing power of said industry, increase the consumption of other industrial and also of agricultural products, the Cement Institute, the applicant herein, has been delegated to cooperate through its duly-constituted and authorized committee, with the National Recovery Administration, as a planning and fair-practice agency for the Portland-cement industry; and such agency now presents on behalf of the industry its proposed Basic Code of Fair Competition, setting forth broad ethical principles of fair competition, and in the supplement thereto, which is a part thereof, essential details of fair trade practices, which together represent the best thought and experience of the entire industry and are deemed pertinent and necessary to effectuate the policies and purposes of the said act as described in Title I, Sec. I thereof, and as explained by the President in his statement published June 16, 1933.

ARTICLE I *Terminology*

As herein used:

1. The term "the President" means the President of the United States of America, or his duly authorized representative, the N. R. A.

2. The term "N. R. A." means the National Recovery Administration.

3. The term "the act" means the National Industrial Recovery Act as approved by the President June 16, 1933.

4. The term "district" means the geographical producing district as now or hereafter fixed by the U. S. Bureau of Mines or other governmental agency, or as may be hereafter determined by the board.

5. The term "institute" means the Cement Institute, the applicant hereunder.

6. The term "the committee" means the cement-industry committee.

7. The term "Portland-cement industry" means the manufacturers in the United States who manufacture the product generally known as and marketed under the name of Portland cement.

8. The term "the industry" means the Portland-cement industry.

9. The term "employer" means members and non-members of the Institute who manufacture Portland cement within the United States.

10. The term "employees" means all persons employed by the employers as herein defined.

11. The term "plant" means a Portland-cement manufacturing plant.

12. The term "the board" means the Board of Trustees of the Cement Institute.

13. The term "effective date" means Aug. 1, 1933, or, if this code shall not at that date have been approved by the President, then on the next subsequent 1st or 16th day of the month.

ARTICLE II *Membership*

1. Any member of the industry shall be eligible for membership in the institute and there shall be no inequitable restrictions on admission to membership therein; this code shall not be construed or administered to promote monopolies nor admit of monopolistic practices; nor to eliminate or oppress small enterprises and shall not be construed or administered to discriminate against them.

2. This code is designed to,² and if approved will result in, the constructive and economically wholesome conduct of the industry and in the protection of consumers, competitors, and employees; it is designed to effectuate the policy of the act in the public interest.

3. Since all employers will participate in the benefits of its constructive activities, it is the consensus of opinion of

² Some word, such as "attain" or "effect," is obviously necessary here to complete the sense.—Ed.

the members of the institute that all employers shall join the institute, take part in its labors, and pay their *pro-rata* share of the cost thereof.

ARTICLE III *Labor Provisions*

Pursuant to subsection (a) of Sec. 7 of the act and so long as this code shall be in effect:

1. (1) Employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and (3) employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

2. On and after the effective date:

(a) The maximum hours of labor per man in the cement industry shall be 36 hr. per week average over each half calendar year, with permission to work a maximum of 42 hr. in any given week, except as otherwise provided.

(b) The members of the Portland-cement industry generally, ever since the advent of the present depression with its drastic reduction in available work for all classes of labor, have, with signal success, distributed the hours of work available at their plants in such manner as to give employment to the greatest number of employees, and the industry may be depended on to continue that practice in order to effectuate the policy of the act and in so far as possible provide work for those normally attached to the industry and as many others as may be practicable. The manufacture of Portland cement is essentially a continuous process and in its efficient conduct requires men of long training and skill; these can not be changed without serious economic losses, impairment of quality of product and adverse effect upon production and employment, and, excepting executive, administrative, technical and sales staffs, those employed in supervisory capacities, no employer shall permit any employee to work—

(1) an average of more than 36 hr. per week during any half calendar year;

(2) more than 42 hr. in any one week; nor employ persons under the legal age limits as provided by the laws of the state in which the operation is located, but in no case less than 16 yr. of age; nor female labor at night after 6 p. m.;

(3) Clerical employees more than 40 hr. in any one week;

(4) Employees in packing and shipping departments more than 936 hr. during any half calendar year.

(c) The producing plants of the industry are located in many states scattered over a wide area extending from Maine to California and from Florida to Washington. Some are in urban communities or large industrial centers, others in rural communities which draw labor from the surrounding country where land provides employees added sources of revenue through cultivation, pasture, pig and poultry raising.

(d) Due to differences in living costs and in climatic and economic conditions throughout this wide producing area, wage rates have varied accordingly and the producing units of the industry have been established and developed under these and other natural conditions inherent in their respective localities. In determining minimum-wage rates herein submitted, the conditions outlined have all been carefully considered with due regard for employees.

(e) Pursuant thereto the minimum-wage rates per hour which, subject to the approval of the President, have been, or on or before the effective date hereof, will be established for the 12 geographical districts respectively set forth in Exhibit B and expressly made a part of this code are as follows:

District Number	Minimum Wage (cents per hr.)
1	40
2	40
3	40
4	40
5	40
(Except Jefferson and Meade Counties, Ky.)	38
6	30
7	40
(Except St. Louis Co., Minn. and Ralls Co., Mo.)	37
8	40
9	30
10	40
11	40
12	40

(f) It is understood that the minimum-wage rates in this code establish *minimum rates* of pay per hour of employment regardless of whether the employee's compensation is based on time or piece-work performance and that the rates of pay shall not be understood to be the maximum rates of pay for the respective districts. It is further understood that wages in the higher-paid classes of employees shall be equitably adjusted to their proper relationship to the wages in the lowest-paid classes, having in view long-standing differentials in pay schedules; with due regard for the effect on pay-rolls.

ARTICLE IV

Reports

1. In order that the President may be kept informed of the observance or non-observance of this code of fair competition and as to whether the industry is taking appropriate steps to effectuate the policy of the act as declared and defined, the committee shall make such reports as the Administrator may require and as often as he may direct, and employers engaged in the Portland-cement industry shall furnish the institute duly authenticated reports, at such times, in such form, and containing such information, as the Cement-Industry Committee may from time to time require, provided, that any information required to be furnished hereunder, of a confidential nature as between competitors in the industry, shall not be available to competitors, nor published in such form as will reveal the identity of any manufacturer furnishing same.

ARTICLE V

Safety Work

1. As an evidence of the general attitude of the industry toward its employees, it points with pride to its achievements in the field of safety. For many years it has occupied the premier position of industry in safety accomplishments; has been regarded as an exemplar in safety technique; and received the Joseph A. Holmes award for the years 1930 and 1932—the more notable because during those declining and depressing years great difficulty was experienced maintaining normal safety *morale* in plant organizations.

Obviously such remarkable results can be attained only by the coöperative effort of constructive management and satisfied, intelligent employees.

2. The safety movement in our industry is conducted by, and for many years has been one of the many constructive activities of, the Portland Cement Assn., the organization of this industry which is devoted to research, education, and the improvement and extension of the use of concrete.

ARTICLE VI

Distribution Through Dealers

1. It is and has long been the general policy of the industry to distribute its product through duly-constituted dealers when, and to the extent that, in its judgment such dealers can and do render an economic service.

ARTICLE VII

Condition of the Industry

The protracted economic depression with its widespread unemployment and industrial disorganization, which induced the passage of the emergency National Industrial Recovery Act, has fallen with unpredictable severity upon the cement industry. Underconsumption has diminished

utilization of producing capacity, with its attendant reduction of employment, to the lowest point within the history of the industry, and for more than two years the cement mills throughout the United States generally have operated only sporadically at high cost, to supply the diminishing demand, to maintain plant organization, and to enable employees to subsist.

The accentuated competitive conditions and concurrent losses inevitable in these circumstances are reflected in the published profit-and-loss statements of representative companies and the distress in which some of the manufacturers now find themselves. Nor is there in prospect substantial relief before another season at least.

It is, therefore, respectfully urged that, *in such an emergency*, the policy of the act can not by this industry be effectuated during the period of the code without governmental sanction of such essential controls as are described in the succeeding articles.

ARTICLE VIII

Control of Production and Distribution

1. It is generally agreed by members of the institute, that it is imperative, in order to effectuate the policy of Title I of the act, to specifically provide in the code for (a) control of production; (b) equitable distribution of sales and shipments; and (c) stabilization of the market on a basis that will enable the industry to pay employees adequate wages sufficient to provide a decent standard of living and yield investors in the industry a fair and reasonable return on invested capital.

Portland cement is a standardized product and the industry is operating at a greatly-reduced rate, thus accentuating competitive rivalry, and it is generally agreed among the manufacturers subject to the provisions of this code that the total production shall be apportioned among the various plants upon some plan of controlled production, to be determined by the Board of Trustees of the Cement Institute, provided that:

(a) Such plan shall be fair and equitable to all plants;

(b) Such plan shall in no way reduce the total production of all plants below what is necessary to amply supply demand;

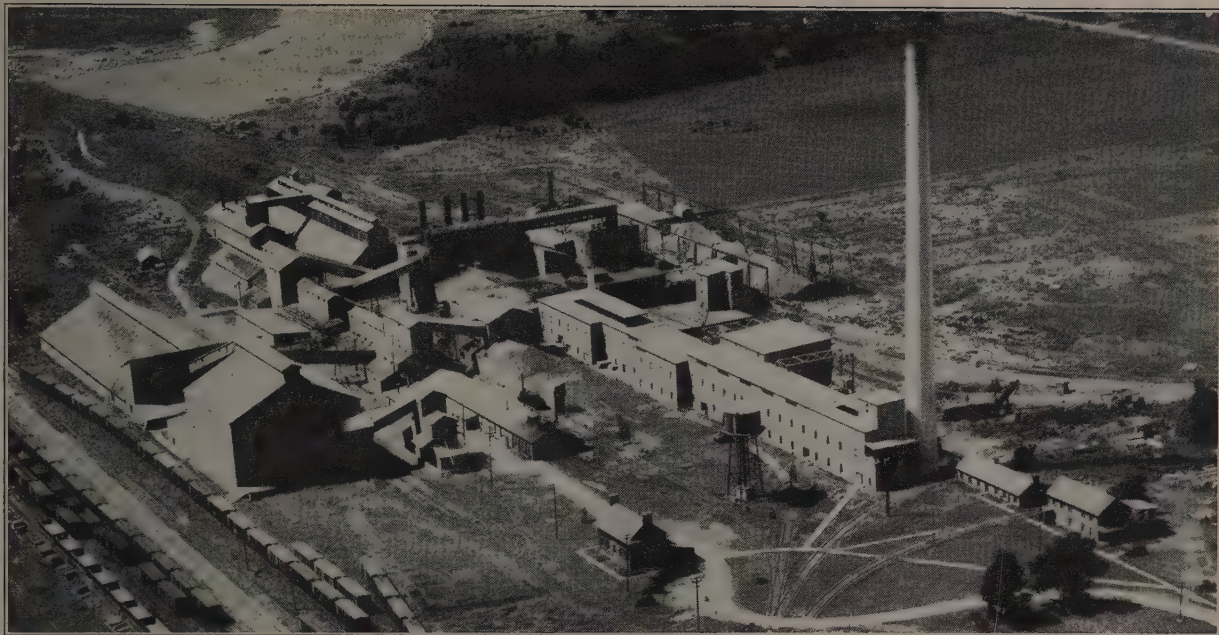
(c) In each district the percentage to be shipped by individual companies shall be determined by the companies located in the district;

(d) Failure of any manufacturer to comply with the established plan for controlled production at any time, as may be provided by the said Board of Trustees, shall constitute an act of unfair competition.

2. *Increase in Productive Capacity.*—Prior to the establishment of a new cement-manufacturing plant, or the increase in the productive capacity of an existing one, or the movement of all or part of such a manufacturing plant from one place to another, the Cement Institute, on receipt of such information, shall promptly collect complete information concerning existing productive capacity in the area in which the proposed new manufacturing facilities are to be located, together with data concerning consumption of cement in that area. If these data disclose that such new manufacturing facilities will result in further increasing the problem of overproduction or overcapacity in such area, the Cement Institute may petition the President of the United States to prohibit the construction, or operation, of the proposed new manufacturing plant or the increase in manufacturing capacities of such existing manufacturing plants.

3. *Excess Productive Capacity.*—If it shall be brought to the attention of the board that any area is burdened with a permanent excess of productive capacity over current or prospective demand, a survey of the plants in such area, by competent engineers of its selection, may be directed by said board to ascertain and report to the board the relative economic status of the several plants in such area; and when such survey is completed and report thereof made to the board with copies thereof to the manufacturers concerned, a meeting of all interested parties shall be duly

(Continued on page 38.)



Aërial view of the plant of Canada Cement Co., Ltd., Port Colborne, Ont. New kiln building and stack at right. Cement-storage and packing building at left.

Canada Cement Co. Converts Plant at Port Colborne to Wet Process

Builds New Raw-Grinding and Kiln Departments and Improves Others

By SHIRLEY BARR

Chief Engineer, Canada Cement Co.

BEGINNING in the year 1928, the Canada Cement Co., Ltd., inaugurated a reconstruction program which was eventually to cover all the plants owned and operated by the company. In carrying out this program the plants at Winnipeg, Man., and Hull and Montreal, Que., were successively re-



Electric shovel loading clay into truck for haulage to cars.

process to the wet process as wet-process equipment had been installed at all the plants previously reconstructed. Complete new raw-grinding and kiln departments were constructed and all power-distribution cables leading to the various mill departments were placed in underground conduits. The coal-



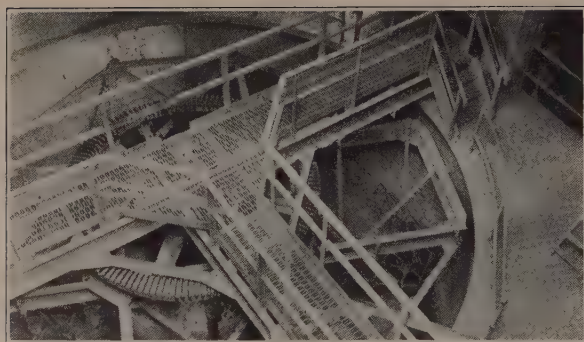
Electric shovel loading train of cars in limestone quarry.

modeled. During the winter months of 1930 to 1931 plans were prepared for the reconstruction of plant No. 8 at Port Colborne, Ont. Construction work was started in June, 1931, and the plant was put into operation again on March 10, 1932.

The method of operating the plant was changed from the dry



Motor truck dumping clay into cars for haulage to plant.



Top view of the clay wash-mill.



Traveling agitator in clay storage basin.

grinding, rock-crushing, clinker-grinding, cement-storage and packing departments were unchanged except for a few minor details.

Plant No. 8 is located near the city of Port Colborne, Ont., which is at the southern entrance of the recently-enlarged Welland Canal on Lake Erie. A privately-owned railway connects the plant with the canal and the coal and gypsum required for plant operation are brought in by water transportation. Bulk cement is shipped from the same dock to various packing stations on the Great Lakes in the company's modern Diesel-electric, self-discharging ship *Cementkarrier*.

Raw Materials.—The quarries which furnish the limestone and clay used are situated about 2 mi. from the plant. The limestone bed is geologically known as the Onondaga formation, which extends northwesterly across the Province of Ontario from Fort Erie, at the mouth of Niagara River, to Lake Huron. An average analysis of the limestone shows:

CaO	49.61 per cent.
SiO ₂	6.14 per cent.
R ₂ O ₃	1.29 per cent.
MgO	1.81 per cent.

The lime content of the stone varies with the depth of the face and certain strata contain also chert nodules which vary the silica content. As a result it is necessary to correct the mix by adding high-calcium stone in varying amounts as required by conditions in the quarry.

The clay is a surface deposit, geologically known as Erie clay and commonly known as "red-top," as it turns red when burned. The average analysis of this clay follows:

SiO ₂	49.85 per cent.
R ₂ O ₃	20.03 per cent.
CaO	9.00 per cent.

Raw-Material Excavating.—The clay deposit overlies the limestone over a considerable portion of the quarry. This simplifies the quarry operations as both limestone and clay cars are hauled to the plant by the same locomotive.

The clay is excavated by a Model 21 Marion electric shovel and is loaded into 5-ton Mack trucks which carry it to the edge of the quarry face where it is discharged into 12-cu.yd. Western side-dump cars "spotted" on the stone-quarry track some 15 ft. below the truck-dumping level.

The rock-quarry face averages 18 ft. in height, and the blast holes are drilled with a No. 2 Clipper well-drill. Forty- and 60-per cent. dynamites are used for primary blasting and 40-per cent. dynamite for secondary blasting.

Transportation to Plant.—The stone is loaded into standard-gage 6-cu.yd. Continental side-dump quarry cars by a Model 37 Marion electric shovel having a 1½-cu.yd. dipper. Eight 6-cu.yd. stone cars and two 12-cu.yd. clay cars make up a quarry train, which is hauled by a Vulcan 50-ton saddle-tank steam locomotive, the clay cars always being placed at the head of the train. The locomotive pulls the train to the plant and pushes it back to the quarry. The empty clay cars are left at the clay-loading hopper while the stone cars continue to the rock quarry, where the locomotive "spots" the cars at the shovel for loading. When the rock cars are loaded, the train crew starts back to the plant, picking up the 2 loaded clay cars to complete the train. On arriving at the plant the 2 clay cars are first "spotted" on the dumping platform of the wash-mill and the 8 stone cars on a by-pass siding at the foot of the crushing-department incline. The empty cars are picked up from the outgoing track of the by-pass siding and are taken back to the quarry.

After the stone cars have been "spotted" on the by-pass siding they are hauled up to the crusher building in 4-car units by means of a Lidgerwood hoist. Before reaching the primary crusher they pass over a 30-ton Fairbanks track-scale which has a registering beam and weighs the stone. The cars are then hauled farther up the incline and dumped one by one into the primary crusher. The slope of the quarry track is steep enough to cause the empty cars to run back to the foot of the crusher-building incline and overhaul the cable from the hoist, and as they reach the foot of the incline they are automatically switched to the outgoing track of the by-pass siding, where they are picked up by the locomotive.

Crushing.—The primary crusher is a No. 11 right-angle-drive McCully gyratory machine which discharges into a 42-in. belt-bucket elevator driven from the primary-crusher pinion-shaft through bevel gears. This elevator discharges the stone into a feed-hopper above a 42-in. by 48-in. Jeffrey Type B swing-hammer crusher which is fed by a

40-in. apron feeder. The hammer-mill is fitted with SKF ball-bearings.

The stone from the hammer-mill is discharged on a short 24-in. belt-conveyor which takes it to a 24-in. inclined belt-conveyor (No. 3). This conveys and elevates the stone from the crusher building to two reinforced-concrete stone-storage bins which also act as feed bins for the raw-grinding Unidan mills. The variation in the lime content of the stone from the plant quarry is corrected by the addition of high-lime stone at the foot of this inclined conveyor. This high-lime stone is received at the plant in hopper-bottom railway cars and is placed in an open storage by means of a 4-motor, 80-ft.-span bridge crane, which has a 2-cu.yd. Mead Morrison clam-shell bucket. This crane reclaims the high-lime stone and delivers it to a hopper that feeds a short belt-conveyor (No. 2). This delivers it to the inclined belt-conveyor (No. 3), which carries the stone from the crushing department to two reinforced-concrete stone-storage bins in the mill building.

The crushing department operates 8 hr. per day and the concrete stone-storage bins above the Unidan mills hold sufficient stone to supply the grinding mills for the full 24-hr. operating period. Provision has also been made to feed mixed stone from the storage bins into 50-ton railway cars which can be shunted under the 2-cu.yd. crane runway and the mixed stone can be stored in a pile separated from the high-lime stone. This provision was deemed necessary in order to provide an adequate supply of mixed stone for operating the raw mill in case of a failure of any of the machinery units in the rock-crushing department.

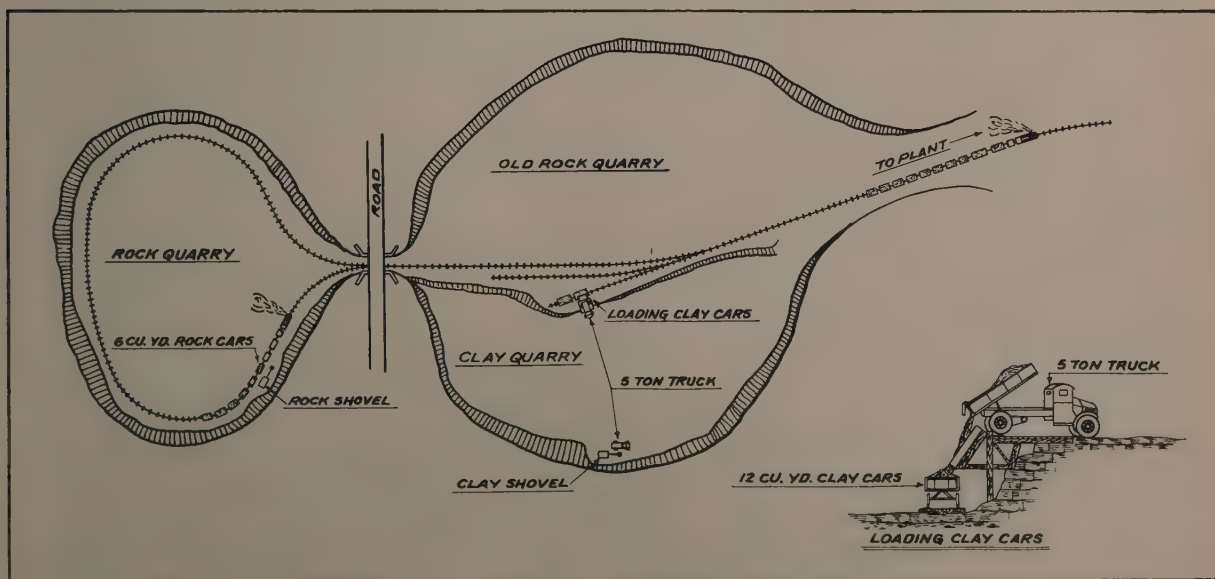
The crushing department, as previously described, was not changed during the reconstruction of the plant in 1931. The capacity of the crusher, namely, 100 tons per hr., was sufficient to supply the needs of the plant when operating on

an 8-hr. day and any changes in this department, other than the re-arrangement of the conveying system, were deemed unnecessary. The swing-hammer crusher delivers stone, 90 per cent. of which will pass a 1-in. square mesh screen.

Clay Washing, Storage and Feeding.—When the clay cars arrive at the wash-mill they are dumped singly into the wash-mill hopper which is provided with 1-in. by 4-in. grid bars spaced 6½ in. apart. This grid serves a triple purpose. It prevents the workmen from falling into the wash-mill, keeps the whole load in the clay car from going into the wash-mill at one time, and stops any large boulders which may be present in the clay.

The clay is fed through the grid bars partly with slicing tools and partly by jetting with a 1-in. hose. The hose is the most effective method of feeding the clay through the grid bars, but in winter it is necessary to heat the clay-dumping shed, otherwise the men using the hose would suffer greatly from the cold water and freezing weather. The balance of the water required for the clay slurry is fed to the wash-mill basin through a 3-in. pipe, the control valve of which is within easy reach of the operator.

The wash-mill is a concrete basin, 26 ft. in diameter and 10 ft. deep, lined on the bottom and on the sides near the bottom with granite blocks. A large concrete pier in the center supports the revolving arms of the wash-mill, and heavy steel-toothed harrows are hung from the ends of the arms by means of chains. The clay is discharged from the mill through two sets of screens which catch most of the foreign material that will not wash down with the clay. It then flows over a weir about 4 ft. high into a concrete pump-sump from which the clay slurry flows by gravity to two 4-in. by 13-in. Wilfey pumps, one acting as a spare. The pumps discharge, through a 450-ft. cast-iron pipe-line of 6-in. diameter, to the clay-storage basin



Plan of stone and clay quarries and sketch of truck loading clay car.

which is located adjacent to the raw-grinding department.

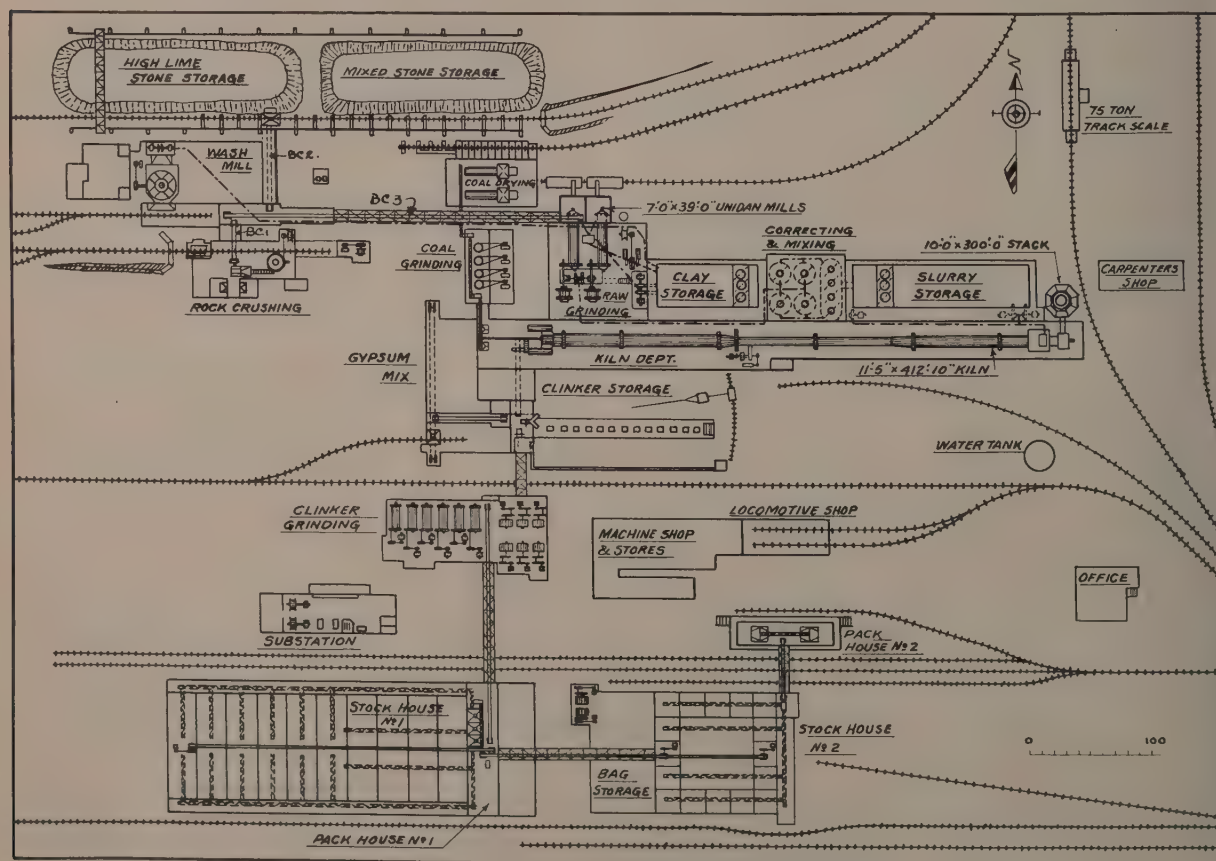
The capacity of the wash-mill varies with the water content in the clay slurry produced, but averages about 18 tons per hr. In order to produce a cement slurry having a low water content, it was found necessary to reduce the water content in the clay slurry to the lowest percentage at which it could be pumped. This was found by experiment to be 55 per cent. at the wash-mill, but the water content of the clay in the storage basin is about 57 per cent., the increase being due to the excess water needed whenever the wash-mill basin is cleaned out. This occurs three times a week owing to the stones and gravel which come in with the clay. About 5 tons of gravel is removed daily from the wash-mill.

The wash-mill was installed in an old monolithic-concrete building which was remodeled to meet the company's requirements, and a new car-dumping platform and shed were erected along the south side of the building. This shed has a steel frame, a monolithic-concrete roof and cement-stucco side walls. The stucco walls are back-plastered on the inside to protect the metal lath from rust.

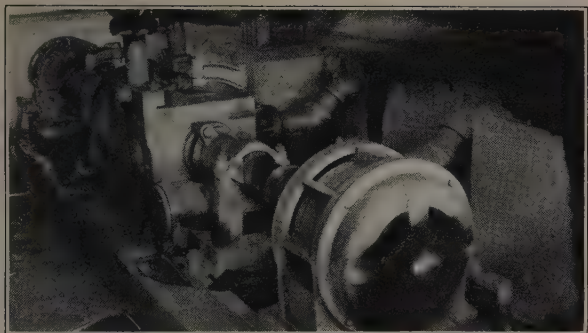
The clay slurry from the wash-mill pumps is discharged into a reinforced-concrete storage basin 35 ft. wide, 84 ft. long and 20 ft. deep, which has a storage capacity of 1,000 tons of dry clay. Here the clay slurry is continuously agitated by means

of a Smidth triple traveling mechanical-and-air agitator. This machine consists of a steel bridge mounted on trucks at each end. The agitating mechanism is mounted on the bridge and comprises three vertical agitator shafts with horizontal arms attached. Compressed-air nozzles, which discharge compressed air at 50 lb. pressure continuously, are attached to the bottom arm of each agitator unit.

The clay slurry is pumped from the storage basin to one Smidth triple clay feeder by means of two 4-in. Model C Wilfley pumps. This feeder consists of a steel-plate constant-level feed tank, an agitator screw and an orifice-type feed-control device. As designed, the operator runs clay into a measuring pot from each orifice and, by means of a stop watch, determines the rate at which the clay flows from the orifice. By trial and error he can therefore adjust the flow from the orifice so that the proper amount of clay will be fed to each of the raw-grinding mills. A swinging spout below the orifice allows the clay from the measuring pot to be discharged back into the main overflow pipe from the feeder tank. Considerable trouble was experienced with the orifice blocking and cutting off the flow of clay to the grinding mill. This upset both the mix and the temper of the chemist. The result was that the gates were removed from the orifices and a heavy continuous flow of material is maintained through the orifice and the swinging spout, and by



Lay-out of Canada Cement Co., Ltd., plant at Port Colborne.



Pumps for handling clay slurry.

changing the position of the bottom end of the swinging spout, the slurry stream can be divided on a knife edge separating the mill-feed pipe from the overflow pipe. This has proved to be very reliable. The cable operating the swinging spout is attached to a graduated board alongside each grinding mill so that the chemist can change his clay feed as required without climbing several flights of stairs. The overflow from the clay feeder goes back to the storage basin by gravity, and the mill feed flows by gravity to the feeders on the raw-grinding mills.

Gypsum Storage and Crushing.—Gypsum for the plant is purchased from mines in Nova Scotia, and is delivered to the company's dock on the old Weland Canal in single-deck Canadian lake steamers. The gypsum is then unloaded and placed on the dock by means of a 15-ton Northwest gasoline locomotive crane. The gypsum is reloaded as required into 50-ton hopper-bottomed railway cars and transported to the plant over the company's private railway. At the plant the gypsum cars are weighed on the same 125-ton track-scale which is used to weigh the coal and high-calcium stone and they are then shunted to a track-hopper in the gypsum-storage building where the cars are dumped.

The gypsum as received at the plant is not sized and the product varies from 4-in. lumps to very fine material and it was therefore necessary to install a crusher to reduce the gypsum to a size suitable for mixing with the clinker. The gypsum is therefore fed from the track hopper to a 24-in. by 24-in. McCaslin pivoted-bucket conveyor which elevates and conveys the gypsum to a 24-in. by 20-in. Jeffrey swing-hammer crusher located on a reinforced-concrete platform near the top of the gypsum-storage building. This crusher reduces the gypsum so that all the product will pass a $\frac{3}{4}$ -in. square-mesh screen. The hammer-mill discharges into a steel hopper which feeds the material to a 20-in. belt-conveyor carrying the gypsum to a 12-ft. by 12-ft. by 16-ft.-deep bin, whence it is shoveled into a hopper above a small reciprocating feeder which has been described elsewhere.

The hopper under the hammer-mill will also discharge gypsum into a bulk storage below the mill, where several car-loads of crushed gypsum can be stored and reclaimed as required by the McCaslin conveyor.



Clay feeder and speed-reducer.

Raw-Material Grinding.—The raw-material-grinding department is located at the west end of the clay-storage basin and adjoining the kiln building near the burning zone. This location makes possible short runs for the clay feed and overflow pipes and also provides for keeping the building warm in winter. A stucco partition wall separates the raw mill from the hottest part of the kiln and prevents the raw mill from becoming overheated during the summer months.

The two reinforced-concrete stone-storage bins located immediately above the feed end of the grinding mills hold sufficient stone to run the grinding mills for the two 8-hr. shifts when the crushing department is not operating. The limestone feeds by gravity to the feeders of two 7-ft. by 39-ft. Smidth 3-compartment Unidan mills. The clay slurry is also delivered to the same feeders. Water connections are also provided in case there is not sufficient water in the clay slurry for the finished slurry. The water connection is principally used for washing out the Unidan mills when they are being shut down for repairs or for any long period. For short shut-downs part of the material is run out of the mill but no water is added, as it was found that this extra water diluted the slurry to a considerable extent and prevented getting a finished slurry having as low a water content as was desired.

The Unidan mills have three grinding compartments with a screening compartment between the first and second compartments. The first or ball-grinding compartment is charged with 25,000 lb. of forged-steel balls. The second compartment is charged with 22,500 lb. of forged-steel balls. The third, or finishing, compartment is charged with 50,000 lb. of heavy steel punchings and balls. The total weight of the grinding charge for each mill is 97,500 lb. All outlet grates and end lining plates are made of manganese steel. The main bearings are ring oiling and water-cooled.

Two manholes are provided for each compartment, including the screen compartment, and a light bridge crane with beam trolley and chain hoist, suspended from the roof trusses above the mills, serves the manholes on both mills. The mill gears are of cast steel with cut teeth fully protected with gear guards. The pinion-shafts are direct-connected to the mill motors without flexible couplings, the shafts being long enough to pre-



Traveling agitator in cement-slurry storage basin.



Rock-crushing hammer-mill and motor.

vent undue shock on the motors and gears when starting. Each of the grinding mills have a capacity of 85 (350-lb.) bbl. per hr. of raw material ground to a fineness of 92 per cent. minus 200-mesh.

The slurry from the grinding mills flows back through the main-bearing foundation piers to a concrete slurry sump located below the floor line directly under the Unidan mills. Two drain gratings with screens are provided in the roof slab of the slurry sump and the floor under the mills pitches to these gratings so that when a mill is dumped all the slurry will run directly to the slurry sump. Also a concrete curb 6 in. high was cast around each mill to prevent the slurry from running all over the mill-room floor. These features aid in keeping the mill floor clean. Open drains in the mill floor are provided so that the floor can be thoroughly flushed each day, keeping it exceptionally clean and tidy at all times.

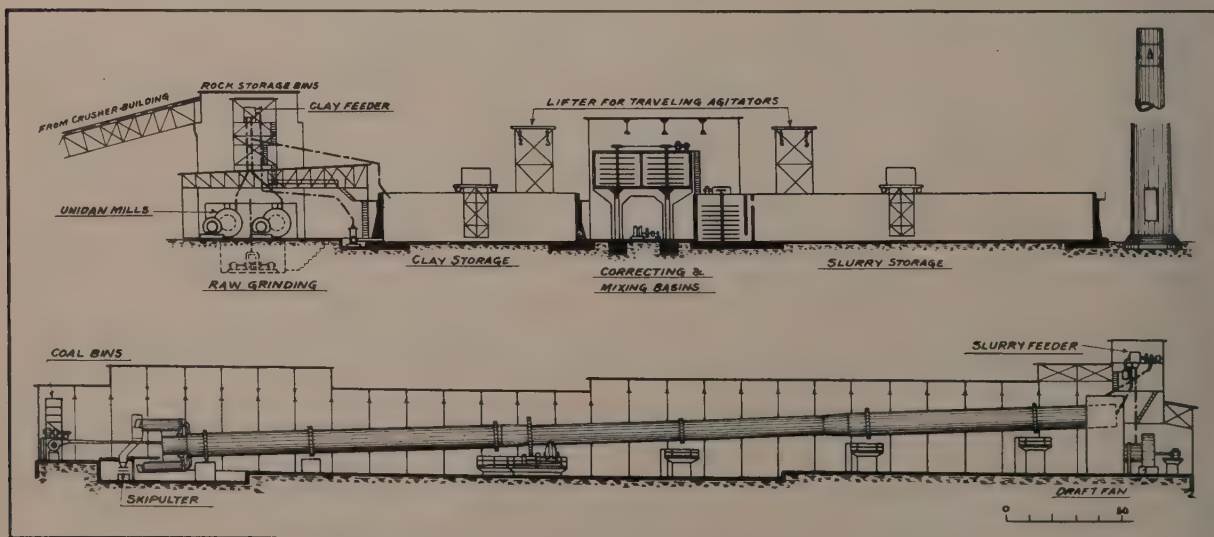
From the sump the slurry flows to two 4-in. Wil-

fley pumps, which discharge it through a 5-in. cast-iron pressure line 250 ft. long to the top of the correcting tanks.

The raw-grinding building was made large enough to accommodate a third grinding mill in case it should ever be needed. Bins for two mills only, however, were constructed. The extra space in the raw mill is used to house the air-compressor which supplies compressed air for both general plant use and for slurry agitation.

The 24-in. and 15-in. by 22-in. Class D2 Ingersoll-Rand air-compressor has a capacity of about 1,000 cu.ft. per min. when delivering air at 90-lb. per sq.in. pressure. This pressure is suitable for general mill requirements, but the air required for agitation is stepped down to 50 lb. per sq.in. by means of a reducing valve. This was found preferable to installing separate high- and low-pressure compressors. The raw-mill operators attend to the compressor thus saving an extra man on each shift.

(To be continued.)



Sectional views of raw-grinding, clay and slurry storage, and agitators (above) and kiln-house (below).

Limestone Screenings, Formerly Wasted, Now Marketed as Stone Sand

Wagner Quarries Co. Has Installed Very Effective Classifying System

PRODUCERS of commercial aggregates have in recent years become increasingly aware of the importance of waste materials as a possible source of valuable by-products. In the crushed-stone industry this problem has been particularly acute because of the large amount of fine material which is created in ordinary crushing, screening, and handling of commercial stone and is usually wasted. Means have been found by many producers to utilize this material in a number of ways, perhaps the most common being the production of stone sand for use in concrete construction. This method has been especially successful in districts where natural sands are scarce.

The Wagner Quarries Co., of Sandusky, O., has solved this problem in an unusually successful manner at its Soldiers' Home Plant near Sandusky. This plant was built in 1924 and at that time represented the latest development in crushed-stone plants, having been one of the first to adopt centralized electrical control of all plant departments, a feature which has been one of the most important contributions ever made to the safety of plant employees and to the protection of the plant machinery. This plant was also one of the first to wash all its product and to adopt the vibrating screen. The present capacity of this plant is about 500 tons per hr.

A brief description of the quarry and plant operations will probably enable the reader to visualize better the recent improvements made. Quarry operations are conducted in the usual manner and the stone is hauled by steam locomotives and cars to the Allis-Chalmers No. 21 primary gyratory crusher, where an air-hoist dumps the stone from the cars

into the crusher. A 42-in. pan-elevator operating on 105-ft. centers carries the stone to a revolving scalping screen. Oversize material goes to an Allis-Chalmers No. 8 gyratory crusher and a No. 14 Newhouse crusher. These discharge the material into a receiving box from which a 42-in. belt-bucket elevator set on 106-ft. centers raises it to two revolving screens which also receive the "throughs" from the scalping screen. These screens serve as secondary scalpers and discharge their oversize to a belt-conveyor feeding a Jeffrey 42-in. by 48-in. hammer-mill. Another 36-in. by 42-in. Jeffrey hammer-mill is used only when material from 4 in. down to 1 in. in size is being recrushed on special orders. Both crushers discharge to the elevator feeding the two revolving screens. The final sizing of the materials is done by 15 Niagara vibrating screens, some of which are equipped with sprays for washing the stone.

These screens discharge the washed and sized stone direct to storage-bins. The waste water and "fines" were formerly carried off through a flume to a large concrete settling tank, where the suspended solids settled to the bottom and were removed at intervals by a locomotive crane. The remainder of the fine material which came from the vibrating screens was dry and was collected in bins under the screens.

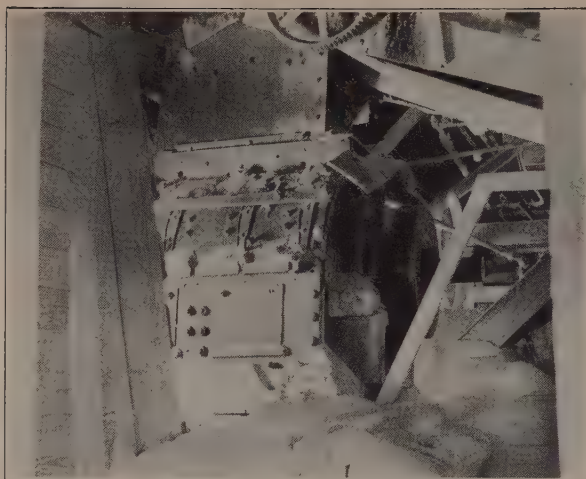
A series of screen tests demonstrated that the screenings contained sufficient material, of the sizes specified in Ohio State Highway Specifications No. M-2-1, to comply with these specifications if they



The Soldiers' Home plant of the Wagner Quarries Co. at Sandusky, O.



The 36-in. by 42-in. hammer-mill used for recrushing material on special orders.



The 42-in. by 48-in. hammer-mill which crushes oversize from secondary scalping screens.



The 18-in. double-screw washer which gives the stone sand a final cleaning before it is sent to storage.

were properly graded. The "fines" also contained considerable material too large for sand, and from 30 to 40 per cent. of the total was 100-mesh and under and had to be eliminated. In order to produce a sand meeting state specifications it was found necessary to reclaim all the material, in both the dry and wet "fines," coming within the limits of the specifications, and the problem of utilizing both these materials without using two screening systems presented itself.

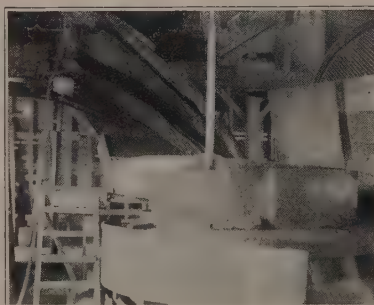
About 1,200 gal. per min. of wash-water was discharged over the flumes from the washing screen, and it was found that this amount of water would carry in suspension a volume of "fines" several times as large as the maximum amount the plant could produce. It was decided to discharge the dry screenings into the wash-water and to use a hydraulic classifying process for making the required separations.

The plant arrangement was such that wash-water was discharged from the washing screens at a point too low to make possible the required classifications and still to allow discharging the material into the sand bins over the railroad

tracks. Therefore, it was decided to pump a part of the waste-water, together with all the "fines" it would carry, back into the top of the mill and discharge them into a classifier located high enough to fill the sand bins over the loading tracks.

This was accomplished by discharging the waste water through a flume into a tank of about 100-cu.ft. capacity. The dry agricultural dust was also spouted into this tank, where it was thoroughly mixed with the waste water. The total material passing through this tank consisted of about 1,200 gal. of water per min. and from 50 to 60 tons of sand, ranging in size from $\frac{1}{2}$ -in. down, per hr. This mixture is flumed to a Wood No. 7172 Auto-Vortex classifier set to overflow 600 gal. per min., or half the water, and to make the sand separation line at 100 mesh.

The purpose of this classifier is to by-pass one-half of the amount of water used to avoid pumping it to the higher level. It also removes half of the minus-100-mesh material in the mixture but retains everything over 100 mesh. The automatic sand valve has been omitted on the classifier and its sand discharge is connected by a 6-in.



Second classifier with 3-deck vibrating screen in background.



Several of the 16 vibrating screens used in this plant.



The classifier which removes waste water from the sand.



Slurry pump which rehandles sand from classifier at left.

pipe to a No. 5-S Morris slurry pump direct-connected to a 50-hp. variable-speed motor having a maximum speed of 900 r.p.m.

The pump, which has a 5-in. discharge pipe, operates against a vertical head of about 60 ft. and handles about 600 gal. of water per min. and about 50 tons of limestone per hr. It discharges on a 4-ft. by 8-ft. triple-deck Niagara vibrating screen having $\frac{3}{8}$ -in. cloth on the upper deck, 2 $\frac{1}{2}$ - and 3-mesh cloth on the middle deck, and 4 $\frac{1}{2}$ -mesh cloth on the lower deck. The material passing over the screens is mixed with larger sizes that are normally low in these sizes and is stored. The sand passing through the lower deck of the vibrator is flumed to another Wood Auto-Vortex classifier which is also set to separate the sand at the 100-mesh line. The material below 100 mesh goes out of the waste flume with the water.

An automatic valve discharges the sand from this classifier, and, as a sand bed is always maintained in the classifier, the amount of water discharged with the sand is what is normally contained in the voids of the sand. The sand is fed to a Webster Mfg. Co. No. S-18 inclined double-screw washer which gives it a final rinsing by means of a counter flow of clean water. This washer also dewateres the sand sufficiently so it can be hauled over city streets direct from the bins without dripping.

The sand plant handles 60 or more tons of limestone "fines" per hr. and of this material about 30 per cent. is minus 100-mesh and is rejected. From the remainder about 35 tons of sand, containing 2 to 2 $\frac{1}{2}$ per cent. of minus-100-mesh material or limestone silt, is reclaimed per hr. Tests taken at random in the storage piles or bins show a maximum variation of about one-half of 1 per cent. in minus-100-mesh content in the sand produced, and this uniformity is maintained throughout wide variations in the loading and crushing operations.

The Wood Auto-Vortex classifiers used in this installation are of the type which has been in successful operation for a number of years in many metallurgical plants in the southwestern mining fields and in quite a few installations for classifying natural sands coming from hydraulic dredges. Several of these have been described in PIT AND QUARRY. The principle involved in the operations of this classifier which makes it adaptable to classifying limestone sand containing a large percentage of "fines" is that of hydraulic separation. Each grain of sand is suspended in a stream of water and is free to settle without being affected by other grains. The construction of the machine, with its revolving cylinder fitted with vanes and discharge ports in the bottom, insures a uniform discharge into the sorting column without eddies or swirling currents.

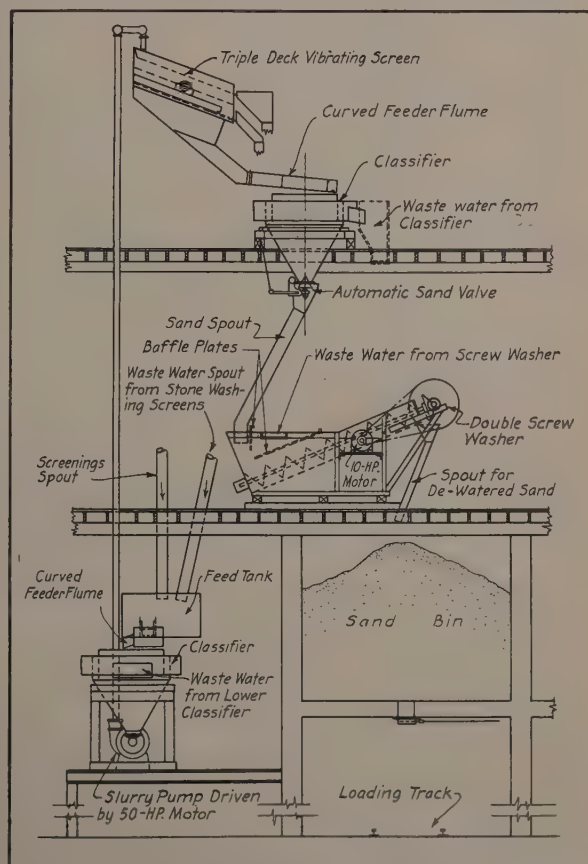
The sorting column, which is the space between two cylinders, is under a pressure head from the revolving cylinders, and carries the water upwards with a uniform velocity over its entire area. The velocity of the water is determined by the amount of water passing through the machine, and any grain in suspension will fall to the bottom of the classifier if its settling velocity in water is greater than the upward velocity of the water in the sorting column.

If the settling velocity of any grain is less than that of the water in the sorting column, it will be carried out with the water.

It is well known that the settling velocity of any material can be determined from its specific gravity and by the size and general shape of its grains. Therefore, the line of separation of materials can be predetermined by variation in the size of the machine and by the volume and velocity of the water passing through it. A circular adjustable weir allows a wide variation of water velocities without a change in its volume, thereby providing a quick method for changing the separation line without decreasing the efficiency of the machine. The grains retained settle to the bottom of the cone and, after a sufficient bed has accumulated, an automatic valve, operated by the weight of the sand, lets out the sand as it accumulates.

The capacity of the machine is determined by the amount of "fines" that must be removed from the sand rather than by the amount of sand it will handle. The amount of "fines" in the material determines the amount of water required, and the amount and the velocity of the water determine the size of the machine, while the amount of sand means only a variation in the size of the automatic valve. The larger the tonnage of sand, the larger the valve required to allow the sand to be discharged freely.

In limestone screenings containing a large percentage of limestone "fines," such as produced at



Cross-sectional elevation of main plant building showing arrangement of sand-washing and classifying equipment.

this plant, there is quite a volume of very finely powdered material which can be called limestone silt. This will remain in suspension in still water from several minutes to half an hour. This silt mixes thoroughly with the water and, since it has no relative motion in moving water, the water in the voids of the discharged sand is just as dirty as the water which carries away the rejected "fines." As the water drains from the sand it settles to a low point in the bins. The sand, acting as a filter medium, takes out the silt at the drainage points, and the analysis of the sand shows an excess of silt at these points, resulting in a spotty material.

In order to overcome this condition and remove the dirty water from the sand, it is discharged into the screw-washer, through which a current of clean water is passed, moving in a direction opposite to the travel of the screws. This action substitutes clean water for the dirty water in the voids of the sand and in the portion of the screws above the water line, dewateres it to about 15 per cent. moisture content.

The screw-washer used for this work is the standard No. S-18 unit built by the Webster Mfg. Co. and consists of two 18-in.-diameter screws, each 14 ft. long, made up of extra-heavy manganese-steel flights assembled in a steel box. The lower bearings are fitted with Goodyear rubber bushings and are connected to a water-line under pressure to reduce the wearing action of the sharp sands. Special baffle plates and splash boards prevent everything except dirty water from overflowing. The washer is driven by a 10-hp. motor with a Texrope drive between the motor and countershaft. The only other power equipment for this washing unit is a 50-hp. variable-speed motor for the pump.

The equipment was designed by Charles E. Wood, inventor of the Auto-Vortex classifier and is manufactured by the Webster Mfg. Co. of Chicago. It was installed by Fred Zeck, general superintendent of the Wagner Quarries Co. under the direction of W. J. Sprow, vice-president and general manager.

Tractor-Drawn Scrapers Strip and Excavate Gravel Deposits

IN view of increased competition from small-pit operators, large gravel producers have found that it is necessary to meet this competition by employing portable outfits of their own. One of the chief difficulties, however, has been the transportation of the gravel to the hopper. Although many types of equipment have been tried, tractor-drawn scrapers have been used with increasing success.

Among the most successful units for this kind of operation are the automatic roll-over types of scrapers. The latest models have control levers which enable the tractor operator to regulate the digging depth as well as raise the cutting edge when the bowl is filled.

On practically all small operations in this section of the country a layer of top-soil, varying from 2 to 4 ft. in thickness, must be removed before the gravel can be exposed. The ease with which these



Three tractor-scraper units stripping off top-soil preparatory to opening a pit in northern Iowa.

scrapers can be handled in close quarters and the speed of operation make them particularly suitable for this type of work.

One of the illustrations shows such units being used to remove the top-soil from a new gravel pit. On this job they employed two "30" Caterpillar tractors with 1-cu.yd. scrapers and one "50" Caterpillar tractor with a 50-cu.ft. automatic roll-over scraper. The larger unit carried approximately a 2-cu.yd. load each trip, averaging a round trip every 3 min. over a 225-ft. haul; while the two smaller units averaged a round trip every 2¼ min., hauling a little more than 1 cu.yd. each trip.

After removing the top-soil these units were kept busy hauling rock and gravel to the crusher pit, thus reducing the equipment investment necessary as well as eliminating those extra transportation costs sometimes found where other types of stripping and earth-moving equipment are used.

On another job in southern Minnesota they are using two 42-cu.ft. automatic roll-over scrapers on their job. Between 10,000 and 11,000 cu.yd. of gravel must be moved. The units average approximately 100 cu.yd. an hr.

Because of the flexibility and ease with which the tractor-drawn scraper can be backed up the side of the pit, gravel operators have found that this type of equipment is particularly adaptable to their gravel-pit operations. The ability to turn in short quarters, the quickness with which the load can be dumped, the surplus load dragged ahead of the scraper and other features have contributed to the popularity of the scraper in this part of the country.

The scrapers shown in the illustrations are made by the La Plant-Choate Mfg. Co., Cedar Rapids, Ia.



Scraper discharging load of gravel to belt conveyor hopper in pit near Rice Lake, Minn.

Correlation of Productivity and Hours of Labor in the Cement Industry

By H. HERBERT HUGHES

Building Materials Section, U. S. Bureau of Mines

THE provisions of the National Industrial Recovery Act have focused the attention of the entire nation upon labor conditions in American industry. A shorter work week is advocated by the N. R. A., and a 30- to 40-hr. week is included in virtually all the codes presented to the President. The number of men to be put back to work through this all-inclusive program has been a pertinent problem for both speculation and research.

Studies of the cement industry (PIT AND QUARRY, September, 1933, pp. 20-22) have shown that the average employee in 1931 worked a 47-hr. week. Furthermore, based strictly on equivalent man-hours of employment, it has been shown that a general adoption of the 40-hr. week by those plants working longer than 40 hr. would have resulted in a 24.1-per cent. increase in the number of men employed, while a reduction of the work week to 35 hr. would have resulted in an increase of 38.7 per cent. However, if all plants had operated on a standard 40-hr. week, the apparent increase in employment would have been only 16.9 per cent. because more than one-fourth of all employees already were working fewer than 40 hr., and an increase in their work week would have thrown some of them out of their jobs. Acceptance of these percentage relationships without attempting to include productivity might lead to exaggerations in estimates of the number of men reemployed.

Relation of Productivity to Hours of Labor.—Little has been done to correlate productivity with hours of labor in the cement industry. The problem is complex and at best the results are speculative. Nevertheless, an attempt to show the relation

between productivity and hours of labor through the use of the meager data available is better than ignoring the issue.

The productivity per man per year in domestic cement mills in terms of hours-per-week of operation during 1931 is shown in Fig. 1. Each point represents an individual mill. The dashed line indicates the logical trend, if productivity is directly proportional to the length of the work-week. For example, as shown by this curve, the production per man of a group of mills operating on a 30-hr. week would be 5,000 bbl. a year, exactly half that of a

Table I.—AVERAGE SEASONAL FLUCTUATION IN THE CEMENT INDUSTRY, 1928-32¹

	Shipments of Finished Cement ²	Production of Finished Cement ²	Production of Clinker ²	Employ- ment ³	Stocks of Finished Cement ²	Stocks of Clinker ²
January.....	43	67	84	96	108	95
February.....	46	60	78	95	115	115
March.....	68	75	92	98	119	132
April.....	97	97	105	103	118	140
May.....	127	121	108	106	116	134
June.....	137	124	115	107	109	121
July.....	144	126	112	106	99	106
August.....	155	130	114	105	87	86
September.....	138	121	110	103	79	72
October.....	127	114	108	100	73	62
November.....	74	93	95	95	82	64
December.....	44	71	81	87	95	73
Percentage of fluctuation.	261	117	42	23	63	126

¹All data are plotted as index numbers with the monthly average for 5 yr., 1928-32, equaling 100.

²B. W. Bagley, U. S. Bureau of Mines.

³U. S. Bureau of Labor Statistics.

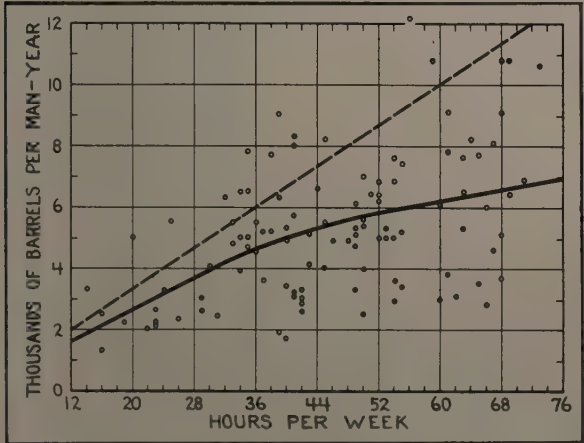


Fig. 1. Productivity per man-year in cement mills in terms of hours-per-week of operation in 1931.

comparable group operating 60 hr. a week. Actually, however, this may not be true, because even a casual glance will reveal that the dashed curve is not the logical trend line of the data plotted on the diagram.

The solid curve is a statistical approximation of a trend line located by graphic methods. The reasonableness of its position is checked by the following statistical data. The Bureau of the Census reported 24,317 wage earners in the cement industry in 1931. Using the Bureau of Mines production figure of 125,429,071 bbl., the productivity per wage earner was slightly more than 5,000 bbl. a year. It is interesting to see that the curve shows the productivity for a 47-hr. week (1931 experience) at about 5,500 bbl. per man. This close correlation indicates that the position of the smoothed curve must be reasonably accurate. This evidence, it should be noted, was not used in making its location.

In interpreting the curve it must be assumed that the distribution of highly-efficient and of obsolescent plants is uniform throughout the range of hours worked—a condition which may not exist,

Table II.—FLUCTUATION IN EMPLOYMENT IN THE CEMENT INDUSTRY IN 1931, BASED ON THE AVERAGE EMPLOYMENT INDEX FOR 5 YEARS, 1928-1932

	January	February	March	April	May	June	July	August	September	October	November	December	Average
Index of employment ¹	96	95	98	103	106	107	106	105	103	100	95	87	100
Number of men ²	23,400	23,100	23,800	25,000	25,800	26,000	25,800	25,500	25,000	24,300	23,100	21,200	24,300
Variation from average.....	-900	-1,200	-500	+700	+1,500	+1,700	+1,500	+1,200	+700	-1,200	-3,100

¹Recalculated from U. S. Bureau of Labor Statistics.

²U. S. Bureau of Census report for 1931; all figures have been rounded to even hundreds.

except possibly during a year when virtually all units are in operation.

Reading from this curve, the productivity per man on a 60-hr. week would be about 6,150 bbl. per year, while on a 30-hr. week it would have declined only 35 per cent. to a little less than 4,000 bbl. Interpreted strictly on a basis of the man-hours of

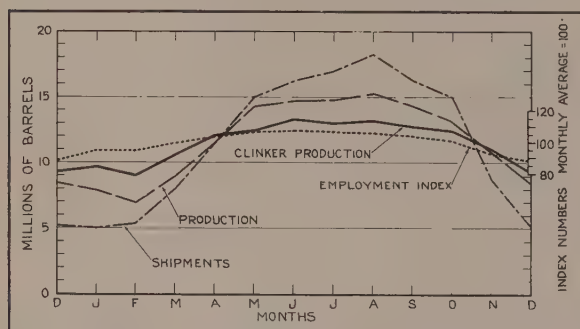


Fig. 2. Seasonal fluctuation of cement production and shipments in 5-yr. monthly averages, 1928 to 1932.

employment, a reduction from a 60-hr. to a 30-hr. week would mean the employment of 100 per cent. more men, while in terms of equivalent production the increase in employment might be only 54 per cent. Actual experience, of course, would give the only correct solution; the increase no doubt would be at least 54 per cent. and certainly not more than 100 per cent.

The problem directly confronting the cement industry, as of 1931 experience, would be that of changing from a 47-hr. to a 36-hr. week. Here again, in terms of man-hours only, a drop from 47 hr. a week to 36, 23 per cent., would have necessitated the hiring of about 31 per cent. more men to maintain equivalent man-hours of employment. According to the productivity curve, the industry when operating on a 47-hr. week shows a production of about 5,500 bbl. per man per yr. A drop to 36 hr. would mean a decrease of 21 per cent. to 4,350 bbl. per man per yr. In terms of equivalent production, therefore, the industry would have required the services of only 27 per cent. more men.

The logical conclusion is that if the cement industry in 1931 had operated on a 36-hr. week, employment might have been increased as much as 27 per cent., but probably not more than 31 per cent., unless those mills already working fewer than 36 hr. a week continued to do so, in which case the increase might have approached 40 per cent. The data are not susceptible to more detailed interpretation.

Seasonal Fluctuation in the Cement Industry.—

The seasonal aspect of the cement industry adds a further complication in the study of employment. It is well known that shipments of cement fluctuate widely from a low in December and January to a peak in August. Employment, however, normally is maintained at a more nearly uniform level.

Table I shows the seasonal fluctuation of shipments of cement, production and stocks (both finished cement and clinker), and employment. All the data are taken from reports compiled by B. W. Bagley of the U. S. Bureau of Mines, except the figures on employment, which are from reports of the U. S. Bureau of Labor Statistics. Each series of data is shown as index numbers calculated on the basis of the monthly average for 5 yr., from 1928 to 1932, equalling 100. The percentage of fluctuation of each series is significant. In an average year the shipments of cement rise from the index number 43 in January to 155 in August, an increase of 261 per cent. The production of finished cement, however, undergoes a rise of only 117 per cent., and the production of clinker, 42 per cent. Study of the variation in stocks easily solves this apparent discrepancy. The stocks of both finished cement and clinker reach a peak during early spring and are drawn upon heavily to meet the seasonal demand in late summer. The stocks of finished cement increase 63 per cent. in an average year, from a low in October to a peak in March. Although the quantity of clinker normally in storage is only about one-third that of finished cement, the fluctuation is considerably wider. Expressed in index numbers, the low is 62 in October, and the peak, 140 in April—an increase of 126 per cent. These relationships are shown graphically in Figs. 2 and 3.

(Continued on page 39)

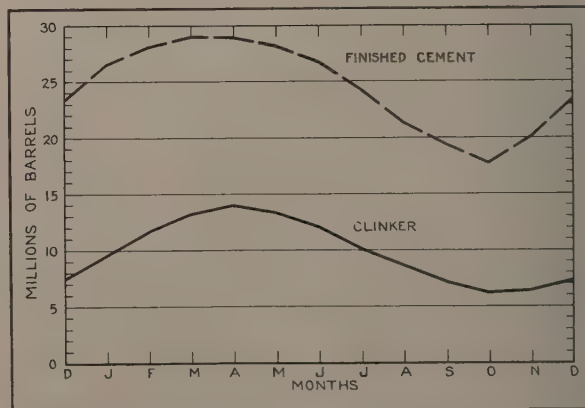


Fig. 3. Seasonal fluctuation of cement and clinker stocks in 5-yr. monthly averages, 1928-1932.

Progress in Letting of Highway Contracts Under Government Road Program

Necessity for Obtaining Federal Approval Delays Starting of Work

STATE highway departments have been slow in beginning work under the Federal \$400,000,000 road program because of the unavoidable delay in obtaining approval for their proposed projects. Most states have filed their projected programs and in many cases important portions of these have received Federal O. K.

Inquiries directed to state highway authorities have, for the reason stated, not been productive of very satisfactory replies, although the situation in this respect is improving. The first inquiry, sent out early in August, brought few informative responses, but subsequent inquiries have brought later and, of course, more complete responses. The most important answers are reprinted below, even though some of them are more than a month old and, therefore, would undoubtedly make a better showing if they could have included later developments. Later responses and revisions of earlier replies will be published from time to time.

Arkansas

Our program as submitted to the Bureau of Public Roads has not yet been approved *in toto*, but we are working on several individual projects and wish to advise that proposals will be received on two such projects as of Sept. 8. It is anticipated that lettings will be held probably twice a month during the winter months to place contemplated projects under construction as soon as possible.—W. W. Zass, *chief engineer*, Arkansas State Highway Commission. Aug. 29, 1933.

California

This department has applied for its share of the appropriation through the submittal of the proposed program. A portion of this program has been approved and it remains now to learn the decision of the Bureau of Public Roads in connection with the remaining portion. Work aggregating approximately \$4,000,000 has been advertised, bids to be opened on Sept. 13, 14 and 15. It is expected that a like amount will be advertised within the next 30 days. Actual work will begin about three weeks following the date of opening of bids.—R. H. Wilson, *acting office engineer*, Dept. of Public Works. Aug. 28, 1933.

Connecticut

The projected road program under N. I. R. A. is not sufficiently advanced to give any publicity.—C. G. Nichols, *executive deputy commissioner*, State Highway Dept. Sept. 1, 1933.

Delaware

Regarding our participation in the \$400,000,000 for highway building, our department has entered its program and will place our work under contract as rapidly as possible. We expect to begin actual work within the next six weeks. I am unable to inform you how much will be finished before the beginning of the next calendar year.—W. W. Mack, *chief engineer*, State Highway Dept. Aug. 2, 1933.

Illinois

The Federal Government has approved practically all the projects submitted by Illinois for work to be performed under Sec. 204 of the National Industrial Recovery Act. These projects have been given publicity in the several

newspapers of the state. I am unable to state when any work will be placed under contract from this program, nor which projects will be advertised first. As rapidly as plans can be prepared the work will be advertised.—E. D. Dryfoose, *road engineer*, Division of Highways. Aug. 31, 1933.

Maine

Practically all our projects under the National Industrial Recovery Act have been accepted by the Federal Government. We have awarded eight contracts, and work has already started on three of these projects. Work on the other five will start next week. We have also advertised three more projects to receive bids on Sept. 13, and will advertise other projects as fast as the plans can be prepared.—R. M. Page, *office engineer*, State Highway Commission. Sept. 1, 1933.

Massachusetts

This department has secured approval of projects to take up its share of the \$400,000,000 appropriation for highway purposes. . . . We have a list of 24 projects that have been approved, and we expect to begin actual work within the next 30 days and have all contracts let before Nov. 1.—A. W. Dean, *chief engineer*, Dept. of Public Works. Aug. 3, 1933.

Minnesota

The Minnesota Dept. of Highways awarded its first contracts under N. R. A. funds Aug. 20 and has advertised for bids on other projects, to be opened Sept. 6, 13 and 19. Projects advertised and awarded amount to about \$1,600,000. They are mostly grading, graveling, subgrade treatment, with some concrete and bituminous surfacing. Lettings will be continued as rapidly as plans and specifications can be prepared and O. K.'s received from the U. S. Bureau of Public Roads.—L. D. Parlin, *director of public information*, Dept. of Highways. Sept. 1, 1933.

Nebraska

We have let contracts to date as shown by the attached mimeograph lists.—R. L. Cochran, *state engineer*, Dept. of Roads and Irrigation. Aug. 25, 1933. [Aug. 11 and Aug. 24 lettings total 307.9 mi. of paving and bridge construction to cost more than \$1,820,000.—Ed.]

Nevada

The preliminary statement covering the apportionment of the allotment to Nevada, also the detailed programs of proposed construction, have been approved by the Public Works Board and bids are being received to-day for four N. R. A. projects. On Sept. 12 bids will be received for four additional projects and by the end of the month we expect to have better than \$1,500,000 of work under way.—H. D. Mills, *assistant state highway engineer*, Dept. of Highways. Sept. 6, 1933.

New Jersey

I am sending you herewith a copy of our program to be carried out under moneys received from the Federal Government under the National Industrial Recovery Act. This program has been approved by the Federal authorities.—C. F. Bedwell, *construction engineer*, State Highway Commission. Sept. 22, 1933. [The "program" referred to shows 24 projects, totalling 60.7 mi. and costing \$5,044,000.—Ed.]

New Mexico

The New Mexico National Recovery Highway program and National Recovery Municipal program of construction have been approved. The state's National Recovery Secondary Highway program has not been approved. The first letting of N. R. A. projects was held Aug. 22. A list of

projects comprising this letting is inclosed. A notice to contractors for a second letting to be held September 15 is likewise inclosed. It is expected another letting will be held late in September and a fourth letting in October. Plans for this time are not yet completed. For your further information we inclose blue-prints showing the N. R. H. and N. R. M. programs as approved.—R. W. Bennett, *engineer of statistics*, New Mexico State Highway Dept. Sept. 2, 1933. [Blue-prints show highway projects totalling \$4,257,505 and municipal projects totalling \$881,000.—Ed.]

New York

We have a program of \$22,300,000 which has been approved by Washington and \$10,000,000 of that has either been advertised or is under contract. We have \$12,000,000 still to advertise. What more can I say?—A. W. Brandt, *commissioner*, Division of Highways. Sept. 1, 1933.

North Carolina

We have already made application for our share of the Federal appropriation which amounts to approximately \$9,522,000 and they have approved our preliminary statement which it was necessary to submit to secure Federal aid on this program. We have also submitted to the bureau a partial statement, plans, estimates and specifications for projects, the cost of which will be approximately \$1,000,000 and expect to secure the approval of these within a very few days. Under the rules and regulations governing the work let under the National Industrial Recovery Act the states are required to secure the recommended approval of the plans, specifications and estimates before the work can be advertised for letting. However, we are expecting to hold our first letting in the fourth week of August.—W. Vance Baise, *assistant to state highway engineer*, Highway and Public Works Commission. Aug. 4, 1933.

Ohio

Ohio's share of the N. R. A. (public-works bill) is \$15,807,852 and the attached list of projects have been approved at Washington for construction under this appropriation. Other projects are pending approval. On Aug. 25 we are conducting a road sale made up of almost all N. R. A. projects. According to present plans proposed improvement will be placed under contract as rapidly as approvals are secured and plans and estimates prepared.—Earl V. Murray, *statistician*, Dept. of Highways. Aug. 8, 1933. [List shows projects totalling \$3,886,900.—Ed.]

Oregon

The Oregon Highway Dept. has submitted, and has had approved, its preliminary statement of allocation of Emergency Highway Funds, this allocation being as follows:

1. For projects on Federal-aid System outside municipalities\$3,053,448
2. For projects on secondary or feeder roads.... 1,526,724
3. For projects in municipalities..... 1,526,724

We have also submitted detailed programs for the first two of the above-mentioned classes of projects, but neither of these has been finally approved by the Federal Government, although we have been authorized to proceed with the submission of plans and contracting of work on such of the proposed projects as the local district engineer of the U. S. Bureau of Public Roads considers to be of "unquestioned priority." Our first letting of projects under this authority will be held on Aug. 24 and 25, and at that time we expect to award contracts for work aggregating about \$1,250,000. . . . On the first of the contracts to be let, work will start about Sept. 1.—R. H. Baldock, *state highway engineer*, Oregon State Highway Commission. Aug. 9, 1933.

Pennsylvania

Our program for the use of Federal funds has been forwarded to Washington and we have not yet received approval. We expect to begin actual work this year and I am unable to give you the further detailed information which you request. You may be assured that Pennsylvania will proceed promptly.—S. S. Lewis, *secretary of highways*, Dept. of Highways. Aug. 2, 1933.

Rhode Island

Four of the projects submitted to the Federal authorities under the National Industrial Recovery Act have now been approved, and we are advertising these projects with opening of bids scheduled for Sept. 13. It is expected that work on these four projects will be started between Sept. 21 and 25.—G. H. Henderson, *chief engineer*, State Board of Public Roads. Sept. 1, 1933.

South Dakota

This state has applied for its share of the \$400,000,000 highway appropriation under the recovery act and part of our program has been approved and the balance will undoubtedly be approved within a reasonable time. Our first letting will be held the latter part of the month.—Thor Soleglad, *assistant highway engineer*, South Dakota State Highway Commission. Aug. 9, 1933. [Aug. 22 and Sept. 14 "notices to contractors" total 264.788 mi. of road construction.—Ed.]

Vermont

Vermont has applied for its share of the \$400,000,000 appropriation for highway building. Our program has been approved and we let by contract part of this work on Aug. 4, consisting of three road jobs, one covering 7.3 mi. of concrete pavement, another 5.8 mi. of mixed-in-place surface, and another 2.2 mi. of macadam pavement.—H. E. Sargent, *commissioner*, Dept. of Highways. Aug. 7, 1933.

Cement Code (from page 24)

called by the board to consider ways and means for the elimination of such excessive productive capacity.

4. Subject to the approval of the President, the board may negotiate an agreement between and among the manufacturers mentioned in Sec. 3 of this article for the closing down or amortization of the less-economical plants involved, to the extent necessary to correct the excessive production in the area or areas involved as shown by the survey above mentioned; provided that in the event no agreement as above contemplated shall be consummated, then the Cement Institute may petition the President for such relief in the premises as may be available under the act.

ARTICLE IX

Method of Quoting—Market Stabilization

1. Portland cement, being a standardized product, is so highly competitive that a difference in price of only 1c. a bbl. will deflect the business from one manufacturer to another and turn orders—large and small—away from the fair, constructive and cooperative majority in the industry to the recalcitrant wasteful minority therein who engage in unfair competition.

A very small minority indeed—even one manufacturer alone—by persisting in such unfair competition can and frequently has completely demoralized the markets within the scope of his trade area. The means considered necessary by this applicant (which truly represents all but a small fraction of the manufacturers) to protect the industry against the unfair competition of the small, recalcitrant and destructive minority therein, subject to the approval of the President, are presented in this basic code and the supplement thereto, which constitute the plan hereby proposed to stabilize our markets and thereby effectuate the policy of the act.

(a) Except in cases where the committee permits otherwise, all cement quotations and sales shall be f.o.b. point of delivery, and all cement shall be sold on such delivered basis; provided, however, that in making quotations and sales to the Federal government, cement shall be sold f.o.b. plant, in the event land-grant rates may be available by the Federal government in arriving at the delivered cost.

(b) No discrimination shall be made in prices, terms, and conditions of sale at the same time and place of delivery between purchasers or users in the same class and similarly situated.

(Concluded on next page)

Each manufacturer shall file its prices and all terms and conditions of sale with the institute within 5 days of the effective date of this code and make same public by broadcast quotations to the trade, so that competitors, the trade, and the buying public may at all times have accurate information relative thereto, and no manufacturer shall deviate therefrom except in the manner hereinafter provided.

(c) Any manufacturer may from time to time change or revise its prices, terms, and conditions of sale, by filing notice thereof with the institute; and no manufacturer shall anticipate, by quotation, sale, contract, or otherwise, any change or revision until after the same shall have been on file at least 5 days at the office of the institute in New York City.

At the expiration of such 5-day period, if no objection by the committee shall have been communicated to the manufacturer submitting same, the said changes or revisions may be made effective; but if objection be so made, the proposed changes or revisions shall stand in abeyance until the objections are withdrawn.

(d) Any manufacturer may meet the prices, terms, and conditions of sale, established by the above method, as of their effective date, and no manufacturer shall deviate from the prices, terms, and conditions of sale, so established, except in the manner above stated.

ARTICLE X

Unfair Competition

The following are unfair trade practices, therefore unfair competition and in violation of the code:

1. Making or promising any bribe, gratuity, gift or other remuneration directly or indirectly to any purchaser or prospective purchaser, or to any officer, employee or representative thereof, for the purpose or with the effect of making a sale of cement; imitating any brand or trade-mark used by any competitor; circulating or disseminating false or misleading information relative to the product, price, credit standing, ability or performance of any competitor; inducing or trying to induce in any manner the violation of any contract with a competitor.

2. The failure and refusal of any manufacturer to assume his proportionate share of the burden of the cost of constructive coöperative activities approved and supported by the majority of the industry and whose benefits are common to all manufacturers.

3. Any act in violation of, or failure to observe, any of the provisions hereof or any rule or regulation issued hereunder, upon approval by the Administrator, shall constitute an unfair method of competition within the meaning of Title I of the act.

ARTICLE XI

Machinery of Enforcement

1. The board shall elect or appoint three persons from the membership who, together with the non-voting members, representing the N. R. A., shall constitute the Cement-Industry Committee. The three persons so representing the industry shall, subject to changes at any time by the board, serve on such committee for such term as the board shall determine.

2. The committee shall have general power to carry out the provisions of this code and any supplement hereto; to make rules and regulations for the administration thereof, and to govern its procedure; to investigate, on its own initiative or on complaint filed with it, the operation and any violation thereof, by any persons, firm or corporation, subject to their provisions; to take proper steps to have enforced such penalties for violation thereof as may be provided by law; to establish such rules and impose such reasonable restrictions and requirements, provide such forms and prescribe such methods and practices as to it shall appear proper and necessary.

3. No member of the Cement-Industry Committee shall participate, as a member of such committee, in any proceedings in which he is interested either as the complainant or respondent, or in which he is in any other manner directly interested, and in the event of any such disqualification, the

remaining members of such committee shall certify such disqualification, together with the reasons therefor, to the president of the Cement Institute, who shall promptly designate a person to sit as a special member of such committee for the purposes of any such proceedings.

ARTICLE XII

Modifications, Additions, etc.

1. The committee and/or the board shall have the power to make from time to time such recommendations to the President as it may deem advisable or necessary to effectuate the policy of the Act and to develop and maintain conditions of fair competition in the industry and any modifications or additions to this code recommended by the committee and/or by the board shall, upon approval by the President, become part of and shall have the same force and effect as other provisions of this code.

2. Whenever the Administrator shall determine such action by him to be necessary to effectuate the policy of the act, he may modify or cancel any action pursuant to this code by any agency established thereunder.

3. This code and all the provisions thereof are subject to the right of the President, in accordance with Sec. 10 (b) of the act, from time to time to cancel or modify any order, approval, license, rule or regulation issued under Title I of the act.

EXHIBIT B

Districts

The 12 geographical districts as described by the United States Bureau of Mines:

- No. 1—Eastern Pennsylvania, New Jersey, Maryland.
- No. 2—New York, Maine.
- No. 3—Western Pennsylvania, Ohio, West Virginia.
- No. 4—Michigan.
- No. 5—Wisconsin, Illinois, Indiana, Kentucky.
- No. 6—Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana.
- No. 7—Eastern Missouri, Iowa, Minnesota, South Dakota.
- No. 8—Western Missouri, Nebraska, Kansas, Oklahoma, Arkansas.
- No. 9—Texas.
- No. 10—Colorado, Montana, Utah, Wyoming, Idaho.
- No. 11—California.
- No. 12—Oregon, Washington.

PLANTS AND PRODUCTIVE CAPACITY

District Number	Number of Plants	Member Plants	Percentage of Membership	Productive Capacity All Plants (bbl.)	Productive Capacity of Member Plants (bbl.)	Member Percentage of Productive Capacity
1	24	24	100	54,100,000	54,100,000	100.0
2	12	12	100	16,800,000	16,800,000	100.0
3	19	19	100	26,100,000	26,100,000	100.0
4	15	14	93	16,900,000	16,073,000	95.1
5	11	11	100	30,300,000	30,300,000	100.0
6	19	19	100	24,400,000	24,400,000	100.0
7	12	11	92	23,700,000	22,868,000	96.5
8	13	13	100	17,700,000	17,700,000	100.0
9	9	8	89	10,200,000	9,569,000	93.8
10	8	6	75	5,500,000	4,881,000	89.0
11	11	9	82	19,100,000	16,763,000	87.6
12	9	9	100	6,600,000	6,600,000	100.0
Total, all districts	162	155	96	251,400,000	246,154,000	98.0

Cement Labor (from page 36)

Variation in Employment.—In Table II the 5-yr. average in the fluctuation of employment is applied to the U. S. Bureau of the Census figure for 1931. If the average number of wage earners for the year was 24,317 (rounded to 24,300), it follows logically that about 26,000 men must have been employed in June, the busiest month of the year in terms of em-

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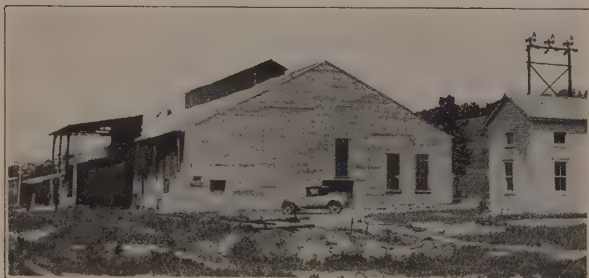
ployment, and only about 21,200 in December, when many mills are relatively inactive.

This variation in employment is typical of past experience. The ideal situation, especially from the viewpoint of long-time planning, is to have uniform operation throughout the year. Since the average employment of the entire industry fluctuated only 23 per cent. for the 5-yr. period, 1928-1932, it is logical to assume that individual mills in the group must have operated on a nearly-uniform monthly schedule. This is borne out by scattered information from a few companies. Adequate storage facilities for both clinker and finished cement are, of course, necessary for the fulfillment of any plan for uniform operation. Although individual mills may be designed to meet peak demands entirely from stocks, the industry as a whole would suffer hardships if any sudden change in its present operating schedule were to be demanded. However, a careful study of existing storage facilities and their adequate evaluation would reveal valuable evidence pertaining to the advisability of planning uniform operation for the cement industry.

Silica-Pulverizing Plant Employs Simple and Direct Methods

In a small frame building within site of a number of the mountain-side silica mines of the famous Berkely Springs, W. Va., district, an interesting manufacturing process is conducted.

Here silica is received in a raw state from near mines and is sent through a pulverizing process for the production of various grades of pulverized



Plant of the National Silica Works.

silica. These products are in demand in a large list of industries, among the most important being pottery and allied ceramics and chemicals. Such items as bath-tubs and other modern plumbing ware owe their lustrous finish in part to the purity of the pulverized silica which goes into their manufacture.

The plant referred to is that of the National Silica Works at Berkely Springs. Its principal equipment consists of 5 Allis-Chalmers tube-mills, which are 6 ft. in diameter and 28 ft. long and are driven by 100-hp. Westinghouse and General Electric motors. T. W. Wood Co. pulley-and-belt drives are employed on all these mills.

From the incoming cars the raw silica is sent to an elevator which, with its 6-in. by 10-in. buckets,



One of the tube-mills and elevator which handles the finished product.

delivers it to an overhead 60-ton storage-tank. This supplies the individual mills through a series of screw-conveyors. The mills, which are loaded with 15-ton charges of imported silica pebbles, have a total output of about 50 tons per day. The finished product is devoid of moisture because of the high heat developed in the milling process. The black impurities occasionally found in the raw material are consumed through the developed heat; the product is as white as snow. To meet the demands of the various industries served, the product is ground to fineness grades as specified, which may vary from 100- to 300-mesh. The product is usually shipped in bulk and in car-load quantities.

The simplicity of the process is enhanced through its almost automatic operation. Through the use of screw-conveyor feed no direct attention is needed for the mills. This fact is significant, since, through the extreme fineness of the silica-sand product, working conditions in the vicinity of the mills are not conducive to good health. Therefore, the actual milling operation is done without attendants within the building.



View in the mill-room, showing power drives to the tube-mills.

MEN OF THE INDUSTRY



RICHARD MOYLE, SR.

RICHARD MOYLE, SR., recently-elected vice-president in charge of operations for the Marquette Cement Mfg. Co., is one of the pioneers of the Portland-cement industry in the United States. Over 40 years ago he went to Oglesby, Ill., as superintendent of the plant which in December, 1892, produced the first Portland cement made from lime rock and shale in the state. When this plant was taken over by Marquette in 1898 Mr. Moyle was retained as superintendent and when the Cape Girardeau, Mo., plant was built he was made general superintendent of both, a position he has held for 36 years. His company has had practically no labor trouble under his management.



Personal Mention

Eddie Phillips has joined the Tyson Roller Bearing Corp., Massillon, O., as field sales engineer in charge of mine car anti-friction bearing applications. His territory is the southern West Virginia field where he held a similar position for Timken for 16 years.

Hubert C. Mandeville, president of the Worcester Salt Co., has been appointed an advisor to the NRA.

John H. Clough was named on Sept. 20 as president of the General Electric X-Ray Corp., Chicago, Ill., succeeding C. F. Samms, who became chairman of the board.

F. J. Reinking, works manager for the United States Gypsum Co. at its Fort Dodge, Ia. plant, has been transferred to St. Paul, Minn., where he will be works manager of the new roofing plant recently purchased from the Sifo Products Co. F. J. Stephens, who had held a similar position at the company's Boston plant, succeeds Mr. Reinking at Ft. Dodge.

F. H. Dickson has been appointed central division manager for the Atlas-Imperial Diesel Engine Co., Oakland, Cal. His offices are at 211 W. Wacker Drive, Chicago, Ill., and his territory includes the central states and the inland waterways as far south as Memphis.

John O. Weber is the new representative of the Coppus Engineering Corp., Worcester, Mass., for the state of Kentucky, with headquarters at 122 Main St., Louisville. His territory does not include a few counties in the state which are handled from the Cincinnati office. He is in charge of sales in this district of the entire Coppus line.

John Catto, Jr., former vice president of the Republic Portland Cement Co., San Antonio, Tex., has again been elected to that position.

Kern Gill, of the firm of John Gill & Son, Cleveland, O., has been appointed industrial adviser for the national limestone industry.

William P. Witherow has been elected a director of the Blaw-Knox Co., Pittsburgh, Pa. He is a director of the First National Bank of Pittsburgh, the Pittsburgh Coal Co., and others.

J. H. Howell has been appointed sales and advertising manager in charge of the marketing of a new truck and marine engine by the American Diesel Engine Co., Oakland, Cal.

Obituary

Robert G. Bear, 55, treasurer of the United States Gypsum Co., and vice president and treasurer of Montgomery Ward & Co., died on Sept. 10 at his home in Evanston, Ill.

William R. Casparis, 42, died Aug. 28 at Delray Beach, Fla. He was formerly associated with the Casparis Stone Co. of Columbus, O., which was founded by his father, but had been living in Florida for the past several years.

Louis F. Drach, 66, president of the Cincinnati Quarries Co., Cincinnati, O., died at his home in that city on Sept. 15.

Frank P. Monaghan, 51, superintendent and works manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y., died on Sept. 18.

John W. Jenkins, 78, proprietor of John W. Jenkins & Son, lime manufacturers, died at his home in Durbin, O., on Sept. 17. He had been a lime manufacturer for 50 years and had conducted his operations at Durbin for over 40 years.

Edward Redfield, 40, office secretary for the Illinois Sand & Gravel Co., Oswego, Ill., died on Sept. 18 of heart disease while at work in his office.

Clement E. Brooke, 43, assistant credit manager of the Lehigh Portland Cement Co., died of heart failure on Sept. 24 while playing golf on a course near Chicago.

Walter Manegold, 54, formerly connected with the Manegold Stone Co., Milwaukee, Wis., and interested in other quarrying operations in that vicinity, died on Aug. 29.

George Greig Oman, for many years connected with the Oman-Bowling Green Stone Co., Nashville, Tenn., died recently in that city after a long illness.

John J. Ball, 71, well-known gravel producer, died at his home in Little Rock, Ark., on Sept. 13. He had organized the Ball-Benton Gravel Co., the Malvern Gravel Co., and others but at the time of his death was connected only with the Arkansas Sand & Gravel Co.

F. R. Bissell, 72, chairman of the board of the International Cement Corp., died on Sept. 25 at his home in New York City.

Crusher Manufacturers Organize and Form Code

The Rock Crusher Manufacturers' Assn. which was formed on June 28, held subsequent meetings on July 11, July 28, and Aug. 16 to formulate a code. Members of the association are:

Acme Road Machinery Co., Frankfort, N. Y.
Austin-Western Road Mach'y Co., Chicago, Ill.
Day Pulverizer Co., Nashville, Tenn.
Diamond Iron Works, Minneapolis, Minn.
Good Roads Machinery Co., Chicago, Ill.
Gruendler Crusher & Pulv. Co., St. Louis, Mo.
Iowa Manufacturing Co., Cedar Rapids, Ia.
Lippman Engineering Works, Milwaukee, Wis.
Monarch Manufacturing Co., Wilmington, Del.
New England Road Mach'y Co., Boston, Mass.
Pioneer Gravel Equ. Mfg. Co., Minneapolis, Minn.
Universal Crusher Co., Cedar Rapids, Ia.
Universal Road Mach'y Co., Kingston, N. Y.
Wisconsin Foundry & Mach'y Co., Madison, Wis.

Officers of the association are: W. L. Harrison, Universal Crusher Co., president; W. H. F. Thompson, Pioneer Gravel Equ. Mfg. Co., vice president; Howard Hall, Iowa Mfg. Co., vice president; W. Cornwell, Austin-Western Road Mach'y Co., secretary and treasurer.

The manufacturers of crushers and representatives of the National Recovery Administration met in Washington on Oct. 3 for the final hearing on the code submitted by this industry.

Coming Events

October 2-6, 1933, Chicago, Ill.—Twenty-second Annual Safety Congress, National Safety Council, Stevens Hotel. W. H. Cameron, secretary, 20 N. Wacker Drive, Chicago, Ill.

October 6, 1933, Washington, D. C.—Delegates of National Assn. of Portable Stone, Sand & Gravel Producers meet with representatives of the mineral aggregates industries and of the National Recovery Administration for a hearing on a combined code.

October 9-11, 1933, Milwaukee, Wis.—Nineteenth annual meeting, American Assn. of State Highway Officials, Hotel Pfister.

December 4-9, 1933, New York, N. Y.—Fourteenth Exposition of Chemical Industries. Grand Central Palace, New York.

Latest Portland-Cement Statistics

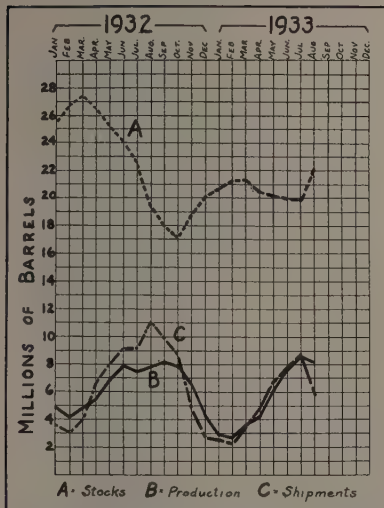


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1932, to August, 1933.

THE Portland-cement industry in August, 1933, produced 8,223,000 bbl., shipped 5,994,000 bbl. from the mills, and had in stock at the end of the month 22,077,000 bbl. The production of Portland cement in August, 1933, showed an increase of 5.0 per cent. and shipments a decrease of 45.4 per cent., as compared with August, 1932. Portland-cement stocks at the mills were 13.8 per cent. higher than a year ago.

The statistics here given are compiled from reports for August, received by the Bureau of Mines, from all manufacturing plants except three, for which estimates have been included in lieu of actual returns.

In the following statement of the relation of production to capacity the total output of finished cement is compared with the estimated capacity of 164 plants at the close of August, 1933, and of 165 plants at the close of August, 1932.

RATIO (per cent.) OF PRODUCTION TO CAPACITY

	August		July		June		May	
	1932	1933	1933	1933	1933	1933	1933	1933
The month...	34.2	35.9	37.6	35.2	27.4			
The 12 months ended	32.1	26.5	26.3	26.0	26.0			

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1932 AND 1933 (In thousands of barrels)

Month	Production		Shipments		Stocks At End of Month	
	1932	1933	1932	1933	1932	1933
January	5,026	2,958	3,393	2,502	25,778	20,624
February	3,971	2,777	3,118	2,278	26,657	21,125
March	4,847	3,684	3,973	3,510	27,545	21,298
April	5,478	4,183	6,536	4,949	26,496	20,542
May	6,913	6,262	8,020	6,709	25,394	20,117
June	7,921	7,804	9,264	7,979	24,043	19,936
July	7,659	8,609	9,218	8,697	22,512	19,848
August	8,210	8,223	10,968	5,994	19,398	22,077
September	7,939		9,729		17,084	
October	6,462		8,743		18,788	
November	4,248		2,835		20,205	
December						
Totals	76,509		80,579			

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1932 AND 1933 (In thousands of barrels)

Month	Production		Stocks End of Month		Month	Production		Stocks End of Month	
	1932	1933	1932	1933		1932	1933	1932	1933
January	6,107	3,036	8,184	6,092	July	6,613	8,569	7,889	6,832
February	5,176	3,110	9,375	6,422	August	7,078	7,835	7,175	6,470
March	5,443	4,147	10,025	6,890	September	7,703		6,708	
April	5,924	4,520	10,511	7,146	October	7,259		6,093	
May	6,273	5,848	9,922	6,769	November	6,290		5,938	
June	6,803	7,836	8,877	6,840	December	4,335		5,995	

a Revised.

DISTRIBUTION OF CEMENT

Shipped to—	July		August		Shipped to—	July		August	
	1932	1933	1932	1933		1932	1933	1932	1933
Alabama	26,937	64,120	43,836	43,833	New Jersey	282,170	262,251	342,947	136,598
Alaska	2,442	1,959	1,570	1,153	New Mexico	11,869	15,563	11,438	10,334
Arizona	13,945	7,364	10,833	7,173	New York	1,246,668	1,161,461	1,437,016	671,520
Arkansas	22,561	41,330	38,764	37,875	North Carolina	28,314	64,219	45,680	28,750
California	366,727	396,165	410,822	467,953	North Dakota	22,693	23,618	16,872	8,634
Colorado	45,274	41,755	58,040	62,839	Ohio	539,371	445,180	774,702	224,994
Connecticut	80,902	112,051	100,729	52,886	Oklahoma	65,442	122,487	135,342	65,182
Delaware	38,443	15,933	32,173	3,729	Oregon	56,746	22,860	63,806	29,112
Dist. of Col.	87,905	97,056	109,666	92,921	Pennsylvania	451,127	687,614	604,752	365,210
Florida	37,770	50,788	49,148	40,668	Rhode Island	2,337	15,645	820	7,088
Georgia	98,189	63,813	106,631	29,751	South Carolina	33,306	51,412	31,578	11,673
Hawaii	16,045	12,794	17,666	9,728	South Dakota	27,280	34,892	32,468	11,546
Idaho	8,961	10,144	10,689	12,859	Tennessee	104,672	86,048	118,730	39,283
Illinois	923,612	1,124,429	867,859	996,408	Texas	331,951	248,184	392,333	210,589
Indiana	432,652	357,953	557,005	238,572	Utah	10,745	26,258	25,011	138,615
Iowa	350,388	210,017	431,321	142,845	Vermont	55,515	26,815	56,063	12,785
Kansas	88,175	123,059	91,387	60,913	Virginia	72,801	133,612	115,664	156,154
Kentucky	118,040	152,711	207,134	135,378	Washington	119,136	66,370	168,362	84,254
Louisiana	87,384	47,917	167,844	28,325	West Virginia	89,286	74,336	93,479	49,891
Maine	80,949	71,464	77,546	35,321	Wisconsin	483,432	370,825	630,006	170,011
Maryland	175,526	93,838	214,006	74,145	Wyoming	7,177	9,904	8,387	5,924
Massachusetts	272,853	223,632	308,259	121,269	Unspecified	16,027		2,525	0
Michigan	400,128	419,326	482,658	287,724					
Minnesota	597,902	192,668	646,666	137,415					
Mississippi	25,444	72,004	58,429	60,345					
Missouri	479,331	369,385	474,524	230,012	Foreign countries	16,186	55,823	23,687	65,030
Montana	15,319	18,330	19,274	12,275					
Nebraska	48,233	78,106	96,855	33,921	Total shipped from cement plants	9,218,000	8,697,000	10,968,000	5,994,000
Nevada	99,152	136,152	97,967	184,288					
New Hampshire	17,092	57,774	29,829	31,659					

PRODUCTION AND STOCKS OF CLINKER (Unground Cement), BY DISTRICTS, IN AUGUST, 1932 AND 1933 (In thousands of barrels)

District	Production		Stocks at End of Month	
	1932	1933	1932	1933
Eastern Pa., N. J., and Md.	1,346	1,581	976	894
New York & Maine	725	773	454	397
Ohio, Western Pa., and W. Va.	503	853	682	593
Michigan	315	521	1,012	906
Wis., Ill., Ind., and Ky.	949	1,039	489	545
Va., Tenn., Ala., Ga., Fla., and La.	381	524	436	451
Eastern Mo., Ia., Minn. and S. Dak.	938	952	471	374
W. Mo., Nebr., Kans., Okla., and Ark.	552	628	499	279
Texas	303	151	238	163
Colo., Mont., Utah, Wyo., and Idaho	281	88	294	246
California	550	578	1,325	1,280
Oregon and Washington	235	147	299	342
Totals	7,078	7,835	7,175	6,470

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN AUGUST, 1932 AND 1933, AND STOCKS IN JULY, 1933 (In thousands of barrels)

District	Production		Shipments		Stocks at End of Month		Stocks at End of July
	1932	1933	1932	1933	1932	1933	
Eastern Pa., N. J., and Md.	1,508	1,669	2,093	912	3,979	4,634	3,877
New York & Maine	879	706	932	402	1,594	1,638	1,334
Ohio, Western Pa., and W. Va.	650	941	1,062	531	2,313	3,168	2,757
Michigan	378	585	786	408	1,598	1,621	1,443
Wis., Ill., Ind., and Ky.	1,211	1,332	2,018	1,077	1,942	2,229	1,974
Va., Tenn., Ala., Ga., Fla., and La.	379	525	604	322	1,434	1,816	1,612
Eastern Mo., Ia., Minn. and S. Dak.	985	976	1,530	916	2,377	2,721	2,661
W. Mo., Nebr., Kans., Okla., and Ark.	645	577	961	256	1,531	1,700	1,379
Texas	325	153	386	198	605	719	765
Colo., Mont., Utah, Wyo., and Idaho	206	89	141	153	482	412	477
California	513	590	549	712	1,014	1,010	1,132
Oregon and Washington	156	80	206	107	529	409	437
Totals	7,825	8,223	10,968	5,994	19,398	22,077	19,848

Aggregates Statistics

PUBLIC works and general building both failed to provide impetus to the aggregates industries in the second quarter of 1933. With cement shipments for the half year 18.6 per cent. lower than for the corresponding period of 1932, it is evident that highway and building construction were still on the down grade. August shipments of cement show no encouraging signs, having dropped 31 per cent. from July and 45 per cent. from August 1932.

Railway shipments of aggregates

By H. H. HUGHES

Bureau of Mines, Department of Commerce

Water shipments in the Pittsburgh district during the second quarter showed a slight improvement of 3.6 per cent. over the corresponding period last year. The 6-mo. total, however, is still 2.0 per cent. below 1932.

The total aggregates shipments were thought to have been extraordinarily low in 1932, but during the second quarter of 1933 they registered a further decline of 21.9 per cent. compared with the same period of the previous year. For the 6-mo. period the relationship was not quite so bad, 1933 shipments being 18.7 per cent. below those of 1932.

Exports and imports of aggregate materials never have been of particular importance, but during 1933 they have dropped to almost nothing. Second-quarter exports were 96.4 per cent. lower than for the same quarter of 1932, and imports dropped 75.6 per cent.

The sharp rise in the index of industrial production during the second quarter of 1933 is especially significant when contrasted with the continued slump in construction and in the shipments of building materials. The indicated domestic demand for asphalt from April to June, however, was only 2.5 per cent. below the corresponding period of 1932. This is further evidence of activity in secondary-road construction, although asphalt used in roofing manufacture also is included in this figure.

Concrete-pavement contract awards amounted to only 4,333,000 sq. yd. from April to June 1933, a drop of 86.7 per cent. from the second quarter of 1932. The total for the 6-mo. period dropped 71.0 per cent., contracts for roads showing an even greater decline.

Fragmentary data indicate that secondary-road construction continues relatively active. Testimony presented at the N.R.A. hearing on the mineral-aggregates code indicated that production by states for road con-

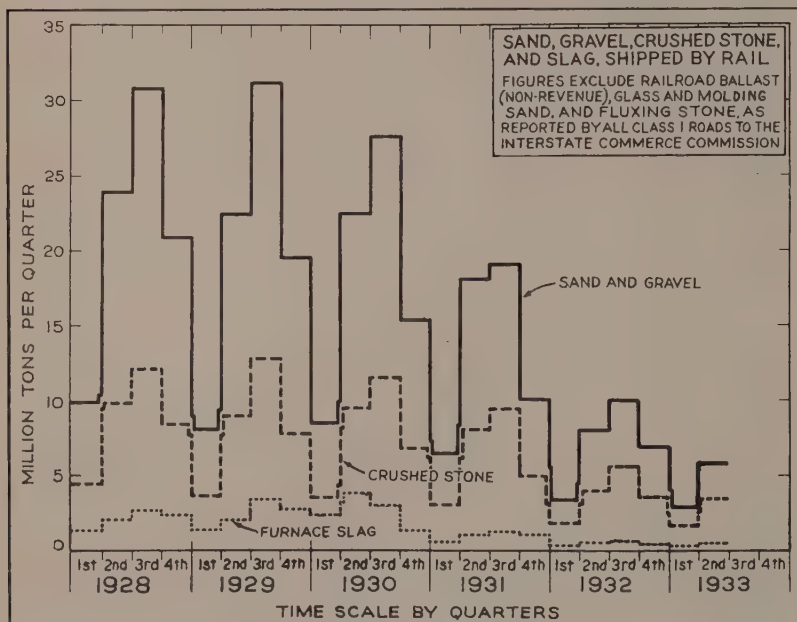


Fig. 1. Quarterly trends in the railway movement of aggregates, 1928 to 1933.

reflect the continued recession in construction. Sand-and-gravel shipments for the 3-mo. period from April to June were only 5,958,234 tons, a drop of 26.9 per cent. from the corresponding period last year. This was worse than the first quarter, the drop for 6 mo. being 23.1 per cent. Crushed stone continue to hold up slightly better than sand and gravel, shipments in the second quarter amounting to 3,366,372 tons, a drop of 17.4 per cent. from the same quarter of 1932. The record for 6 mo. shows a decline of 12.8 per cent. from 1932. Slag shipments, a relatively small part of the total aggregates requirements, in the second quarter were only 2.0 per cent. lower than in the same period last year, but the 6-mo. total was 13.0 per cent. below 1932.

The relation between shipments during the second quarter and data for previous quarters are shown graphically in Fig. 1.

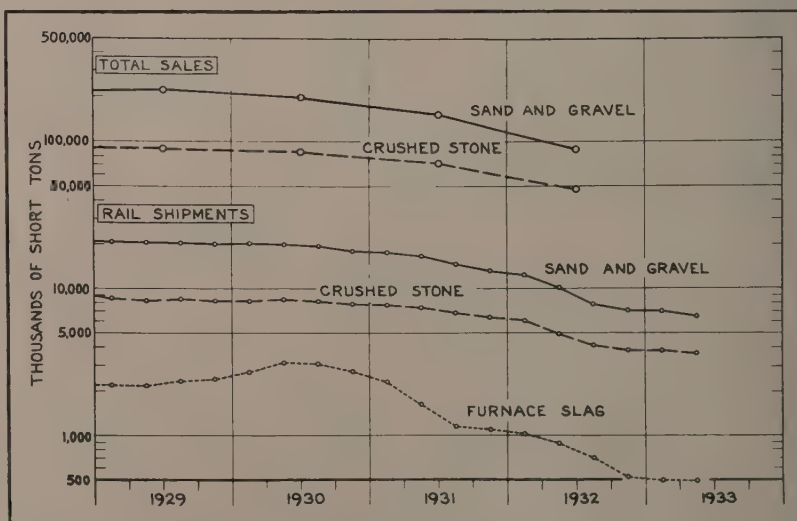


Fig. 2. Total annual sales and 4-quarter moving averages of railway shipments of aggregates, 1929 to 1933.

Table I—SUMMARY OF MOVEMENTS OF AGGREGATE MATERIALS AND INDICATORS OF THEIR MARKETS IN THE SECOND QUARTER OF 1933

	Second Quarter			Calendar Year to June 30		
	1932 April-June	1932 ¹ April-June	Change From 1932 (per cent)	1932	1933 ¹	Change From 1932 (per cent)
Railway shipments, Class I roads ² (excludes nonrevenue railroad ballast)						
Sand and gravel ³ short tons	8,148,606	5,958,234	-26.9	11,522,781	8,865,379	-23.1
Crushed stone ⁴ short tons	4,075,528	3,366,372	-17.4	5,923,983	5,165,112	-12.8
Furnace slag..... short tons	587,337	575,401	-2.0	1,001,491	870,889	-13.0
Water shipments, Pittsburgh district ⁵						
Sand and gravel..... short tons	412,251	427,233	+ 3.6	563,744	552,472	- 2.0
Total aggregates accounted for..... short tons	13,223,722	10,327,240	-21.9	19,011,999	15,453,852	-18.7
Foreign trade in sand and gravel						
Exports to all countries..... short tons	27,718	1,003	-96.4	44,266	4,921	-89.9
Imports from all countries ⁶ short tons	77,691	18,946	-75.6	86,857	23,530	-72.9
General business activity						
Portland cement shipments ⁷ ... bbl.	23,820,000	19,637,000	-17.6	34,304,000	27,927,000	-18.6
Indicated domestic demand, petroleum and lake asphalt ⁸ short tons	621,750	606,341	- 2.5	971,023	866,562	-10.8
Index of industrial production ⁹ index numbers	61	79	+29.5	66	71	+ 7.6
Highway construction, concrete-pavement contract awards ¹⁰						
Total, monthly average.... sq. yd.	32,516,000	4,333,000	-86.7	44,300,000	12,856,000	-71.0
Roads only, monthly average..... sq. yd.	29,646,000	3,559,000	-88.0	40,439,000	11,446,000	-71.7
Building construction contract awards						
Total floor space, monthly average ¹¹ sq. ft.	41,925,000	42,323,000	+ 0.9	83,749,000	68,048,000	-18.7
Residential, floor space, monthly average ¹¹ sq. ft.	19,630,000	22,475,000	+14.5	41,146,000	33,557,000	-18.4
Engineering construction value, monthly average ¹² sq. ft.	\$328,604,000	\$232,791,000	-29.2	\$598,115,000	\$446,630,000	-25.3

¹Figures may be subject to revision. ²Interstate Commerce Commission. ³Excludes glass and molding sand. ⁴Excludes fluxing stone. ⁵Chief statistician, Board of Engineers for Rivers and Harbors. ⁶Excludes glass sand. ⁷B. W. Bagley, U. S. Bureau of Mines. ⁸A. H. Redfield, U. S. Bureau of Mines. ⁹Federal Reserve Board; 1923-1925—100. ¹⁰Portland Cement Assn. ¹¹F. W. Dodge Corp. ¹²Engineering News-Record.

struction and maintenance is becoming increasingly important. Any increase in the production of this type of material logically would be reflected in an accelerated movement from railway to truck shipment. It follows that the total production of aggregates, including noncommercial material, may not be as drastically low as the statistics of railway shipments tend to indicate. If the Bureau of Mines total figures for 1932 are found to be more heavily weighted by non-commercial stone than past experience would indicate, it follows logically that the 1932 estimates published in these columns some months ago will prove to be low.

Building improved in the second quarter of 1933 compared with the corresponding quarter of 1932, but figures for both years are so low that a nominal gain of only 14.5 per cent. represents a very small increase in aggregates requirements. Engineering construction continued to decline. Money appropriated for public works is gradually becoming available as projects are advanced, but some months will probably elapse before its benefits will accrue to the aggregates industries.

Four-quarter moving averages of aggregates shipments are shown in Table II. Each figure is calculated by averaging the four quarters prior to

and including the quarter for which the tonnage is given. For example, the tonnage for the third quarter of 1931 represents the average of the last quarter of 1930 and the first three quarters of 1931.

These values become of greater significance in Fig. 2, where they are plotted on a logarithmic scale. The use of this device allows the making of a direct comparison of the percentage-change relationships. An examination of the curves shows that the gap between sand and gravel and crushed stone is gradually diminishing. For railway shipments this is due partly to the fact that the percentage of truck

shipments has increased at a greater rate for sand and gravel than for crushed stone. Of greater significance, however, is the same trend shown by the total annual sales of the materials. Obviously, the markets for crushed stone have held up better during the depression than those for sand and gravel.

The wide fluctuation of slag shipments is worthy of more detailed study. Apparently, slag built up increased markets during 1930, but suffered a severe recession during the slump in blast-furnace operations since 1931.

Manganese Steel Buys Audubon Wire Cloth

The Manganese Steel Forge Co., Philadelphia, Pa., acquired the entire business and assets of the Audubon Wire Cloth Co., Inc., Audubon, N. J., on May 1, 1933. The business is being conducted by the Audubon Wire Cloth Corp., a new and wholly-owned subsidiary of the Manganese Steel Forge Co. Officers of the new corporation are: L. W. Jones, president; L. W. Jones, Jr., vice president and treasurer; A. W. Zackey, secretary. This combination now includes the manufacture of a complete range of wire cloth for industrial, mechanical and commercial requirements. A comprehensive plan of modernization and expansion now under way involves considerable new equipment.

Jeffery Mfg. Co. Buys Traylor Vibrator Co.

The Jeffrey Mfg. Co., Columbus, O., has acquired the entire patent, manufacturing and selling rights for all devices heretofore manufactured and sold by the Traylor Vibrator Co., Denver, Colo. The Denver plant of the Traylor company has been closed and the business will hereafter be conducted as the Jeffrey-Traylor Division of the Jeffrey Mfg. Co., in Columbus, where both electrical and mechanical parts of equipment will be manufactured. James A. Flint, formerly vice president of the Traylor Vibrator Co., is in charge of the new division.

Table II—FOUR-QUARTER MOVING AVERAGES OF AGGREGATES SHIPMENTS, 1929-33¹

Year and Quarter	Sand and Gravel (tons)	Crushed Stone (tons)	Furnace Slag (tons)
1929—1st.....	20,982,000	8,613,000	2,201,000
—2d.....	20,620,000	8,408,000	2,188,000
—3d.....	20,702,000	8,559,000	2,353,000
—4th.....	20,347,000	8,380,000	2,459,000
1930—1st.....	20,436,000	8,369,000	2,705,000
—2d.....	20,446,000	8,506,000	3,129,000
—3d.....	19,550,000	8,205,000	3,089,000
—4th.....	18,496,000	7,957,000	2,750,000
1931—1st.....	17,987,000	7,832,000	2,318,000
—2d.....	16,859,000	7,489,000	1,645,000
—3d.....	14,707,000	6,930,000	1,165,000
—4th.....	13,390,000	6,465,000	1,100,000
1932—1st.....	12,618,000	6,138,000	1,030,000
—2d.....	10,148,000	5,088,000	886,000
—3d.....	7,954,000	4,141,000	704,000
—4th.....	7,191,000	3,837,000	526,000
1933—1st.....	7,094,000	3,825,000	497,000
—2d.....	6,528,000	3,647,000	494,000

¹Data calculated from reports of Interstate Commerce Commission.

Traffic News and Comment

Recent I. C. C. Decisions

Cement.—In response to fourth-section application No. 15148, the commission has authorized carriers having circuitous routes to establish and maintain rates on cement, car-load minimum weight 50,000 lb., from Menominee, Mich., to destinations in Wisconsin and Michigan, the same as the rates in effect *via* direct lines or routes, from and to the same points constructed on the basis of distance Scale II rates prescribed in Western Cement Rates, 48 I. C. C. 201, 52 I. C. C. 225, 69 I. C. C. 644, and 132 I. C. C. 273, and to maintain higher rates from, to and between intermediate points, provided that the rates from, to and between higher rated intermediate shall not exceed the rates constructed on the scale basis, and that the terms and conditions of fourth-section order No. 7,260 shall apply.—I. C. C. F. S. O. No. 11,348.

Crushed Stone.—In a supplemental report the commission has modified its former report exempting from the application of emergency charges the rates on crushed stone from Mt. Vernon, Mullins and Yellow Rock, Ky., to Ravenna, Stanford, Berea, Ft. Estill, Silver Creek and Paint Lick, Ky.—I. C. C. Docket No. 25,135, Part 4, Intrastate Emergency Charges, Kentucky.

In a supplemental report the commission has modified its former report and order to permit the publication of rates on crushed stone and agricultural limestone (unburned) and agricultural limestone screenings from McVitty's, O., to various points in Ohio. All the proposed rates are reductions.—I. C. C. Docket No. 25,938, Intrastate Emergency Charges, Ohio.

Dolomite.—In a supplemental report the commission has modified its former report in 149 I. C. C. 329 to permit the publication of reduced rates on fluxing stone and raw dolomite between stations in Ohio.—I. C. C. Docket No. 25,938, Intrastate Emergency Charges, Ohio.

Sand.—In a supplemental report the commission has granted permission to reduce the rate on molding sand from Cassity to Elkins, W. Va.—I. C. C. Docket No. 25,135, part 13, West Virginia.

Sand and Gravel.—The commission has modified its former report thereby excepting from the application of the emergency charges the rates covering the movement of sand and gravel between stations on the K. G. J. & E.—I. C. C. Docket No. 25,135, Part 13, Intrastate Emergency Charges, West Virginia.

New Complaints Filed

Lime.—Alleging the application of the emergency surcharge on the rates on lime from Menominee, Mich., to des-

tinations in Wisconsin results in violation of Sec. 1, 3 and 13, with competitors in Wisconsin preferred, the complainants ask for new rates and reparation.—I. C. C. Docket No. 26,134, Limestone Products Co., Menominee Mich. v. C. & N. W. et al.

Sand and Gravel.—Complaining that the rates on sand and gravel from Hawarden, Ia., to destinations in Nebraska are prejudicial to complainants and preferential of competitors located in Nebraska, new rates are sought.—I. C. C. Docket No. 26,138, L. G. Everist, Inc., Sioux City, Ia. v. C. & N. W. et al.

Rate-Committee Dockets

New England Freight Assn.

Lime.—Carriers propose to establish a commodity rate on common, hydrated, quick or slaked lime, except agricultural and fluxing lime, car-load minimum weight 40,000 lb., from West Rutland, Brandon, Cavendish, Leicester Jct., Middlebury and New Haven, Vt., to Erie, Pa., of 19c. per 100 lb.—Docket No. 30,690.

Trunk Line Assn.

Asbestos.—Carriers propose to establish rates to apply from Sherbrooke (Ex. Q. C. Ry.), Warwick and Danville, Que., to Clarence Center, N. Y., on asbestos gravel, refuse or shorts testing 0-0-5-11 or lower, 26½c., plaster or finish 28c., and cement or fiber 36½c. per 100 lb.—Docket No. 31,409.

Amiesite.—A proportional rate on coated crushed stone from Utica, N. Y., to Childwood, N. Y., on traffic destined beyond on the Grasse River R. R. of \$1.00 per ton,¹ is proposed by shippers.—Docket No. 31,341.

Cement.—Shippers of cement at Rosendale, N. Y., are proposing that rates be published on their product to the same destinations and on the same basis as applies from Binnewater, N. Y.—Docket No. 31,324.

To restore the rates to the normal basis the carriers propose to increase the 100-lb. rates on cement from Buffalo, and East Buffalo, N. Y., to destinations on the N. Y. C., to East Rochester, N. Y., to 9½c., to Pittsford, N. Y., to 10c., to Model City to Burt, N. Y., inclusive, to 9c., and to Appleton to Hamlin, N. Y., to 10c.—Docket No. 31,356.

Crushed Stone.—Shippers propose a reduction in the rate on crushed stone and related articles,¹ from Jamesville and Rock Cut, N. Y., to Oneida Castle, N. Y., from \$1.00 to 90c. per net ton.—Docket No. 31,388.

Crushed Stone, Sand, Gravel and Coated Stone.—Carriers propose to increase the rates on crushed stone, sand, gravel and coated crushed stone from the Port of Norfolk to P. R. R. destinations shown in P. R. R. tariff I. C. C. 16. A statement of the proposed

rates will be furnished on request.—Docket No. 31,348.

Fluxing Stone.—Shippers propose a reduction in the rate on fluxing, furnace or foundry limestone, car-load minimum weight when loaded in container cars 110,000 lb., or when loaded in open-top cars as per footnote 1, from Thomasville, Pa., to Erie, Pa., from \$2.39 to \$2.10 per gross ton.—Docket No. 31,332.

Ground Limestone.—Shippers propose the establishment of commodity rates on ground limestone and related articles, car-load minimum weight 50,000 lb., from Jordanville, N. Y., to destinations on the N. Y. C. and W. S. R. R. ranging from \$1.15 to \$2.70 per net ton. A statement of rates will be furnished on request.—Docket No. 31,312.

Roasted Dolomite.—Shippers propose rates on roasted dolomite, car-load minimum weight 60,000 lb., from Blue Bell and Williams, Pa., to Brackenridge, Breaburn, Clairton, Donora, Duquesne, Latrobe, Munhall, New Kensington, Pittsburgh, Vandergrift, Bessemer, McKeesport, and Homestead, Pa., of \$1.99; to Beaver Falls, Farrell, Midland, Aliquippa, Butler, Washington, Pa., Steubenville, Toronto, Warren, Youngstown, O., Follansbee, Weirton and Wheeling, W. Va., of \$2.24; to Alliance, Canton, Cleveland, Lorain, and Massillon, O., of \$2.54; and to Mansfield, O., \$3.11 per net ton.—Docket No. 31,423.

Sand.—Shippers propose rates on (A) industrial sand and on (B) common sand,¹ from Mill Creek and Ridgeway, Pa., to Erie, Pa., of (A) \$1.35 and (B) \$1.30 per net ton.—Docket No. 31,386.

Central Freight Assn.

Cement.—Carriers propose reductions in the rates on cement from Mitchell, Ind., from 10½c. to 7c. and from Limesdale, Ind., from 11½c. to 7½c. to Evansville, Ind., on traffic destined to various points on the Ohio, Green and Barren Rivers.—Docket No. 37,004.

Shippers propose a reduction in the rate on cement, car-load minimum weight 50,000 lb., from New Castle, Pa., to West Jefferson, O., from 21½c. to 13½c. per 100 lb.—Docket No. 37,038.

Shippers propose a rate from Universal, Pa., of 13½c. and from New Castle, Pa., of 12½c. per 100 lb., to apply on cement to Marblehead, O.—Docket No. 37,062.

Crushed Stone.—Carriers propose to reduce the rate on crushed stone from Keepert, Ind., to South Bend, Ind., from \$1.13 to 85c. per net ton.—Docket No. 36,884.

Shippers at McVitty's, O., are asking for rates on crushed stone to various destinations in eastern Ohio based

on the P. S. M. 923 scale.—Docket No. 37,099.

Ground Limestone.—Carriers propose to establish a rating on ground limestone and limestone screenings in box-cars, car-load minimum weight 60,000 lb., from Bedford, Mitchell and Putnamville, Ind., to destinations in C. F. A. territory except the states of Indiana and Illinois, of 60 per cent. of sixth-class rates.—Docket No. 36,966.

Gypsum.—Shippers propose the following reduced rates to apply on ground gypsum, car-load minimum weight 80,000 lb., from (A) Grand Rapids, Mich., and from (B) Gypsum and Port Clinton, O.—Docket No. 36,916.

To	(A)	(B)
Battle Creek, Mich.	10 c.	13 c.
Kalamazoo, Mich.	9 c.	13½ c.
Niles, Mich.	11 c.	14 c.
Vicksburg, Mich.	9½ c.	13½ c.
Watervliet, Mich.	10½ c.	14½ c.

Lime.—Shippers propose a rate of 6c. per 100 lb. to apply on lime, car-load minimum weight 50,000 lb., from Gibsonburg and Woodville, O., to Toledo, Wights, Latcha and Walbridge, O., and to alternate with the present rate of 7½ c., car-load minimum weight 30,000 lb.—Docket No. 36,938.

Limestone Dust.—Shippers propose a reduction in the rate on limestone dust, car-load minimum weight 50,000 lb., from Piqua, O., to New York, N. Y., and grouped points, from 26½ c. to 22c. per 100 lb.—Docket No. 37,058.

Slag.—Shippers at Canton and Massillon, O., are asking for the establishment of rates on crushed commercial slag, car-load minimum weight 80 per cent. of the marked capacity of the car, to Circleville, Columbus, Delaware, Dayton, Findlay, Fostoria, Kenton, Lima, Lancaster, Newark, New Lexington, Springfield, Upper Sandusky, Bucyrus, Mt. Vernon, and Tiffin, O., made on the basis of P.S.M. 923 Scale.—Docket No. 36,921.

Shippers propose a rate on slag, other than commercial, in open-top cars, from Rankin, Pa., to Columbus, O., of \$1.85 per net ton.—Docket No. 37,061.

A rate of \$1.05 per net ton is proposed to apply on slag, car-load minimum weight 80 per cent. of the marked capacity of the car, from Massillon, O., to Marion, O. A shippers proposal.—Docket No. 37,128.

Talc.—Shippers propose a commodity rate on crude talc, car-load minimum weight 80,000 lb., from Ishpeming, Mich., to Detroit, Mich., of \$3.75 per net ton.—Docket No. 37,093.

Illinois Freight Assn.

Agricultural Limestone.—It is proposed to reduce the rate on agricultural limestone¹ from Valmeyer, Ill., to C. & E. I. stations, Salem, Carter, Kell, Texico, Bakerville, Bonnie, Ina and Whittington, Ill., from \$1.19 to \$1.05 per net ton.—Docket No. 7,489.

Cement.—A proportional rate on cement, car-load minimum weight 50,-

000 lb., has been proposed to apply from Utica, Ill., to La Salle, Ill., on traffic destined beyond.—Docket No. 7,480.

Crushed Stone.—It is proposed to reduce the rate on crushed stone¹ from Thornton, Ill., to Beardstown, Ill., from \$1.26 to \$1.14 per ton and from Lehigh, Ill., to Beardstown, Ill., from \$1.13 to \$1.01 per net ton.—Docket No. 7,449.

Lime.—It is proposed to establish a rate on lime, car-load minimum weight 50,000 lb., from Cordova, Ill., to Dixon, Ill., of 8 c. to alternate with the present rate of 9½ c., car-load minimum weight 30,000 lb., and a rate on the higher minimum from Port Byron, Ill., to Dixon, Ill., of 8½ c. to alternate with the present rate of 9½ c. applying on the lower minimum.—Docket No. 3,210-J.

Sand and Gravel.—It is proposed to establish the following rates on sand and gravel from Bloomington, Ill., to points in Illinois: to Chicago, 75 c.; Mazonia, 73 c.; Nevada, 76 c.; Varna, 88 c.; Lacon, \$1.01; Chenoa, 63 c.; Lexington, 50 c.; Towanda, 40 c.; Griggs, 70 c.; Danville, 74 c.; Loda, \$1.00; Rantoul, 83 c.; Peoria, 72 c.; E. St. Louis, \$1.07; Drake, \$1.19; Boyle, \$1.13.—Docket No. 7,100.

Western Truk Line Committee

Amiesite.—Shippers at Kansas City, Mo., propose the establishment of rates on coated crushed stone¹ to stations in Missouri on the C. B. & Q., made by use of the distance rates published in Item 195, C. B. & Q. Tariff 6,208-N.—Docket No. 4,781-O.

Crushed Stone.—Shippers propose the establishment of rates on crushed stone¹ from Dell Rapids, S. D., to destinations in Iowa and Minnesota, made on the following scale.—Docket No. 2,898-K.

Miles	Rate	Miles	Rate
40.....	\$0.75	105.....	\$1.15
50.....	.80	110.....	1.17
60.....	.85	115.....	1.19
65.....	.91	120.....	1.22
70.....	.94	125.....	1.24
75.....	.97	130.....	1.26
80.....	1.00	135.....	1.28
85.....	1.04	140.....	1.31
90.....	1.06	145.....	1.33
95.....	1.09	150.....	1.35
100.....	1.13	155.....	1.37
	160.....		\$1.40

Shippers are proposing that the car-load minimum weight applying on crushed stone in Item 8,520 of W.T.L. Tariff 111-H from Colorado common points to the Missouri River, be changed from 90 per cent. of the marked capacity of the car to 40,000 lb.—Docket No. 1,266-D.

Crushed Stone, Sand and Gravel.—The car-load minimum weight applying on crushed stone, sand and gravel between points in W.T.L. territory is generally as shown in footnote 1 for the car used. It is proposed to change this rule to provide that when the carrier can not furnish a car of the capacity ordered by the shipper and for

its own convenience furnishes a car of greater capacity than the one ordered, the car so furnished will be used on the basis of the minimum car-load weight specified as applicable on a car of the size ordered, provided the shipper does not load in the car furnished in excess of what could have been loaded in the car ordered. In no case will orders be accepted for cars of less than 60,000 lb. marked capacity.—Docket No. 3,350-F.

Southern Freight Assn.

Ground Limestone.—Shippers propose a rate on ground limestone car-load minimum weight 60,000 lb. from Cartersville, Tate and Whitehouse, Ga., to Roseville, O., of \$4.39 per net ton.—Docket No. 2,688.

Talc.—Shippers propose a rate on crude or ground talc from Haysville, N. C., to Akron, O., of \$5.75 per net ton, car-load minimum weight 50,000 lb.—Docket No. 2,696.

Southwestern Freight Bureau

Crushed Stone.—Shippers are proposing a line of rates from Moline, Kan., to destinations in Oklahoma based on 80 per cent. of the scale in W.T.L. Tariff 162-F, plus 6 c. per ton.—Docket No. 1,752.

Rates from Moline to other destinations in Oklahoma and Texas on the same basis are proposed in Docket No. 1,755.

Lime.—Two scales of rates are proposed to apply on lime from the shipping points involved in I. & S. Dockets 3,742 and 3,776 on the one hand and that portion of southwestern states, Arkansas, Oklahoma, Louisiana (west of Mississippi River) and Texas located on and east of the line beginning at Anthony, Kan., thence A. T. & S. F. to Medford, Okla., thence R. I. to Ringgold, Tex., to Ft. Worth, Tex., thence G. C. & S. F. through Cleburne, Tex., McGregor, Tex., to Temple, Tex., thence M. K. T. to Georgetown, Tex., thence I. G. N. to San Antonio, Tex., thence T. & N. O. to Corpus Christi, Tex., using Scale A and other lime-shipping points located west of the above line using Scale B. The car-load minimum weight under col. 1 is 50,000 lb., and under col. 2 is 30,000 lb.—Docket No. 479.

Miles	Scale A	Scale B
5.....	7½	9
10.....	8	10
15.....	8	10
20.....	8½	10½
25.....	8½	10½
50.....	9½	12
100.....	11½	14½
200.....	15	18
300.....	17½	22
500.....	22½	28
1,000.....	35	44
1,500.....	47½	59½

The complete scales will be furnished on request.

¹ The car-load minimum weight will be 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

Foreign Developments

New Cement Plant Uses Gigantic Rotary Kiln

A new cement plant was put in operation in August, 1932, at Lormont, a suburb of Bordeaux, France, by the Etablissements Poliet et Chausson, large French producer. The plant lies on the right bank of the Garonne alongside the hill which furnishes its raw materials, and is distinguished, according to a description in *Revue des Matériaux de Construction* (No. 284:164-175, May, 1933; J. Prouteau), by sagacious utilization of a restricted area, as well as its up-to-date electrical and mechanical installations.

The hill which provides raw materials consists of successive beds of pure clay, marl, limestone and another marl; it is worked in benches with power shovels. Clay and marl are made into a slip in wash-mills, and the stone is crushed in two stages in large rolls. The materials are mixed and ground to slurry in two mills 8 ft. 4 in. in diameter and 43 ft. long, and stored in four correcting basins. Thence the slurry is pumped to a single rotary kiln 327 ft. (100 m.) long with a diameter of 15 ft. in the burning zone, 12 ft. in the middle zone and 13 ft. 4 in. in the preheating or drying zone. The kiln, as well as all grinding mills, were furnished by Polysius. Slurry and pulverized coal are fed by means of variable-speed motors. The clinker passes to a cooler 9 ft. by 98 ft., and thence to storage. It is ground in two finish-grinding mills similar to the raw-grinding mills.

Russian Slag-Cement Plant Boasts Capacity

New equipment installed at the Petrovsky cement plant near Dnepropetrovsk, U.S.S.R., has increased its capacity from 250,000 to 1,000,000 bbl. yearly of iron-Portland and blast-furnace cement. It is one of the first slag-Portland cement factories in Russia, having been built before the War, in 1914, when the Kosorgskaya smelter was built.

The plant operates by the dry process, using limestone and blast-furnace slag. These are dried in four rotary driers 88 in. in diameter and 65 ft. long. They are mixed and ground in three old Krupp 3-compartment mills (50 in. by 26 ft.) and a new Unidan 80-in. by 39-ft. 4-compartment mill. Two cloth-filter dust-collectors are used in the raw-grinding department. The mix is then burned in an old Polysius kiln 80 and 96 in. in diameter and 118 ft. long, and a new Russian-built kiln 10 ft. in diameter and 166 ft. long. The kilns are fired with pul-

verized coal. The clinker goes to storage and thence to two Unidan mills 88 in. in diameter and 39 ft. long, slag being added before the grinding. Fuller-Kinyon pumps transfer the cement to storage-silos.

The power consumption is 15 kw.-hr. per bbl., and the fuel consumption is 1,500 calories per kg. of cement, or 21 per cent. of the fuel used (7,000 calories per kg.). The plant employs 17 engineers and 319 workers, 134 in the actual plant operation. The costs are reckoned at 2.25 rubles per bbl. of iron-Portland and 1.60 rubles per bbl. of blast-furnace cement.—Dipl.-Ing. I. L. Snachko-Yavorsky in *Zement* 22:165-167, March 30, 1933.

Finds Sugar Increases Lime-Mortar Strength

Some interesting tests on the effect of sugar admixed with lime mortar have been made at the Clay Industry Chemical Laboratory, Berlin, and are reported in *Tonindustrie-Zeitung* 57:544-545, June 12, 1933. The lime was slaked dry, and its composition (ignited) was 90 per cent. CaO, 2 per cent. MgO, and 8 per cent. soluble silicates. Comparative tests were made with ordinary mortar and mortar containing 1 per cent. sugar admixture (computed in the dry mixture). In 1:3 mortar standard tests the strengths obtained were:

	Ordinary Mortar		With 1% Sugar	
	Tension (kg. per sq. cm.)	Com- pression (kg. per sq. cm.)	Tension (kg. per sq. cm.)	Com- pression (kg. per sq. cm.)
7 days	3.0	7.0	6.2	14
28 days	3.3	11	9.0	22
56 days	4.8	16	9.3	29

In a bending test the ordinary mortar broke at 5.9 kg. per sq. cm. and the mortar with sugar at 12 kg. In a permeation test, using specimens 2 cm. thick that had been stored 28 days in air, under a 10-cm. water column 1 hr., the ordinary mortar absorbed 20 cu. cm. per sq. cm., while the mortar with sugar absorbed 3. Finally, to study the effect of weathering, the investigators left specimens on the laboratory roof, exposed to sun, air, rain, snow and frost, for 9 mo. Those specimens, then tested, showed compressive strengths of 26 kg. per sq. cm. for

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the ordinary mortar and 38 kg. for the mortar with sugar; that is, both had increased in strength, although the spread between the two had diminished.

German Stone Plant Draws Wide Interest

A new stone-crushing and screening plant that has been widely discussed and criticized in Germany was recently put in operation by the Hohner Quarzporphyr-Werke A. G. in northwest Saxony. The stone is a very hard quartz porphyry, with portions so hard it will scratch through window glass. The plant crushes and screens 120 cu. yd. of this material hourly to three sizes of coarse and five sizes of fine stone.

Features of special interest to the German industry, according to Wolf von Bleichert in *Steinindustrie* (28: 87-93, May 25, 1933), are the continuous course of the stone from the primary crusher to the storage-bins, and the installation of all crushing and screening equipment in a superstructure above the storage bins, from which the finished sizes may be loaded directly into cars. Two men can supervise the equipment, and a traveling crane at the top of the building facilitates any necessary replacements or repairs of the machinery. Three jaw crushers and a set of crushing rolls reduce the stone in successive stages, and each crusher is followed by two double-deck shaker screens of woven-wire mesh, from which the products are spouted to storage-bins or lifted to the following crusher. The conveying and elevating equipment is of Bleichert make and the crushers and screens Krupp Grusonwerk.

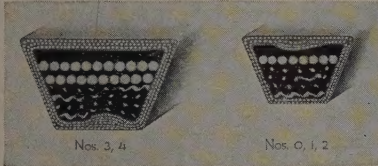
Medieval Stucco Work Called "Estrichgips"

A recent German book for the historian of art, Friedrich Berndt's *Stucco Plastics in Medieval Saxony*, reveals that the enduring specimens of gypsum plastic works, some of them 700 yr. old, were done not with what is now known as stucco but with what is really *estrichgips*. The author finds a relation between the calcium-carbonate content (running up to 5 per cent.) and the hardness of the specimens he tested; those with the highest content of carbonate had the highest hardness, equivalent to marble or fluorspar. Some artificial cut stone was also produced by casting *estrichgips* in forms.—*Tonindustrie-Zeitung* 57:582, June 22, 1933.

New Machinery and Supplies

Worthington Announces Improved V-Belt Drive

The Worthington Pump & Machinery Corp., Harrison, N. J., announces a new and improved type of Goodyear Emerald Cord V-Belt in connection with the Worthington Multiple-V-Drive. Two variations are used in the new construction. Nos. 0, 1 and 2 have one endless cord in one plane, and



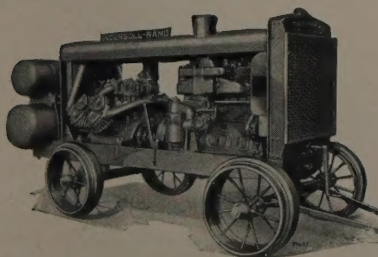
Worthington V-belt.

Nos. 3 and 4 have two endless cords in two planes. All cords are completely embedded in rubber and the tension and compression sections of the belt are also of rubber, with layers of fabric distributed through the compression section to prevent excessive flexibility.

The belt is molded to shape and is completely enclosed in a fabric envelope which is cut on the bias to prevent it from taking any of the load. This new design is said to produce a greatly improved belt flexing capacity and to result in a longer life. A more accurate matching of the belts in each drive is also claimed due to the closer standardization of the stretch characteristics of the individual belts.

Ingersoll-Rand Develops New Portable Compressor

The Ingersoll-Rand Co., New York, N. Y., has developed a new portable air compressor which is said to adapt the advantages of 2-stage stationary compressors and makes them usable in portable units for the first time. These improvements, it is claimed, give the new compressor economies and efficiencies never before attained in portable machines and tests show



Ingersoll-Rand portable compressor.

that, size for size, the new compressor will deliver 23 per cent. more compressed air than previous models.

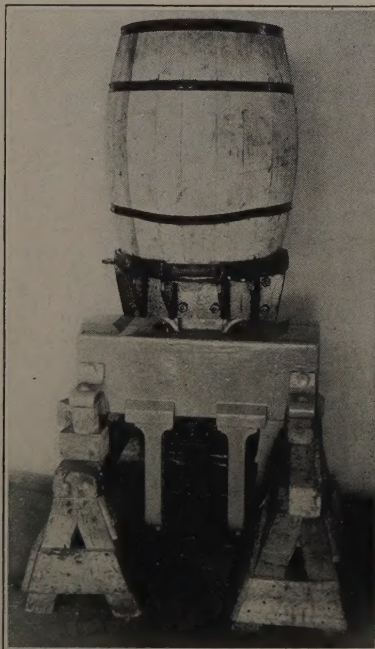
The compressor in the new machine is a 2-stage, air cooled unit. It has two low-pressure cylinders, arranged in a V, and between them, in vertical position, a high-pressure cylinder. Adoption of air cooling eliminates the danger of freezing and keeps the size and weight of the assembly within reasonable limits. Partially compressed air from the low-pressure cylinders passes through an intercooler. Air drawn through the intercooler network by a fan is used for cooling.

A Waukesha 4-cyl. gasoline engine of the heavy-duty type with patented "Full-Power" combustion chamber, designed expressly for this service, supplies the power. A clutch for easy starting is interposed between engine and compressor. Improved regulation for the compressor is provided. Inlet valves play no part in this and are free to perform their primary functions. The speed of the machine is automatically reduced when unloaded.

This new portable compressor is made in 4 sizes which have piston displacements of 125, 185, 250, and 370 cu.ft. per min. It is obtainable in a variety of mountings.

Barrel Packer Uses Vibrating Principle

The Jeffrey-Traylor Division of the Jeffrey Mfg. Co., Columbus, O., is



The Jeffrey-Traylor vibratory barrel packer.

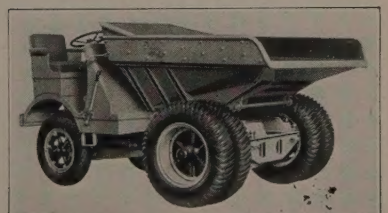
marketing a new barrel packer which uses the Trayco vibrating principle. Tests on gypsum, lime, sand, and limestone showed that packing performances varied greatly with the characteristics of the material. Sand was packed to maximum density in one minute with a 16 per cent. increase in density, while it required about five minutes to reach the maximum density of gypsum or lime with an increase in density of 75 per cent., one-third of which will occur in the first 5 seconds.

One of the advantages claimed for this unit is the speed at which it may be operated. The barrel is not fastened to it in any way, thus facilitating rapid changing. No cams or bearings are used and power requirements are very low. The machine can be mounted on scales so that weighing and packing can be done simultaneously.

Koehring Wheel Dumptor Uses Pneumatic Tires

The Koehring Co., Milwaukee, Wis., is manufacturing a new wheel Dumptor which is said to have many advantages over the original crawler Dumptor for certain conditions. This machine is equipped with 42-in. by 9-in. dual-pneumatic tires on its driving end and 34-in. by 7-in. pneumatics on its steering end. It has a capacity of 4 cu.yd., a drawbar pull of 8,000 lb. in low gear, and a high speed of 10 mi. per hr. Three speeds in both forward and reverse make a shuttle service possible with this unit, a great advantage for short hauls.

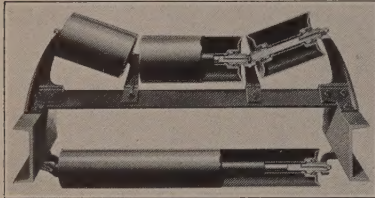
The Wheel Dumptor has a constant-mesh transmission and gear shifting is accomplished by internal gear-type clutches. The engine is a heavy-duty 4-cyl. unit equipped with removable sleeves and has full-pressure lubrication to all moving surfaces. The only grease connection is on the water pump. The engine is governed to run at 1400 r.p.m. by a fly-ball type of governor. The carburetor has two air cleaners, one a centrifugal type and the other an oil-type washer, and there is another air cleaner on the crankcase breather pipe. Optional, interchangeable wheel equipment is obtainable consisting of lugged steel wheels for the drive and regular steel wheels for the steering end.



Dumptor on pneumatic tires.

Jeffrey Belt Idlers Electrically Welded

The Jeffrey Mfg. Co., Columbus, O., manufactures the Jeffrey Reliance belt idlers in three types: troughing, picking belt and flat belt. All of these are furnished with 4, 5, or 6-in. diameter rolls and for belt widths up to 60 in. The rolls are made of steel tubing with electrically-welded steel ends

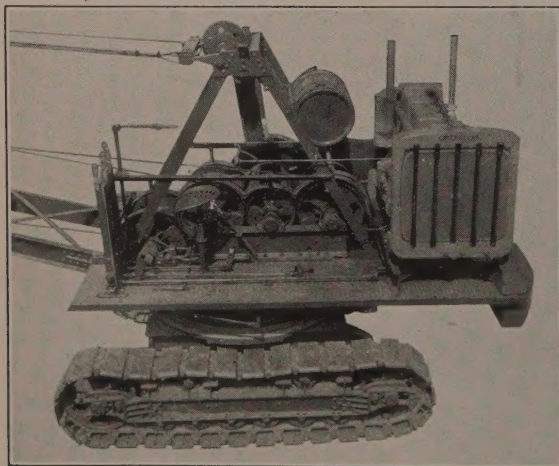


Jeffrey Reliance troughing and return idlers cut open to show their construction.

which are rounded to prevent injury to the belt. Oversize Timken tapered roller bearings of the self-aligning type are used and are mounted on steel axle shafts so designed that the bearing alignment can not be disturbed in handling. Double labyrinth grease seals protect all bearings against dirt. The one-piece malleable iron stands are so designed that the pulleys can be removed by lifting them after the lock nuts have been loosened.

Speeder 5/8-Cu.Yd. Shovel Has Diesel Power Unit

The Speeder Machinery Corp., Cedar Rapids, Ia., has introduced a new lightweight, low-priced, convertible Diesel shovel, the Speeder D4, which is claimed to be the first light full-Diesel shovel to be built in this country. This model is rated at 5/8-cu.yd. capacity for shovel, crane, dragline, or pull-shovel work. Both the crane and dragline booms are 35 ft. long, the shovel boom is 18 ft. long, and the shovel dipper stick is 14 ft. long. The shovel can be obtained with a standard



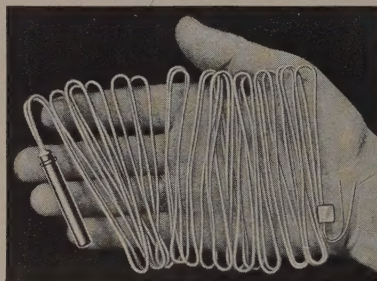
The new Speeder 5/8 cu. yd. light-weight convertible Diesel shovel.

Speeder dipper or a manganese dipper for heavy rock work.

The Speeder D4 is powered with a Caterpillar Diesel engine and a Morse lubricated silent chain transmits the power to the mechanism. The travel gears are heat treated and the crawlers are a new lug-driven friction-free type. All shafts are dead end and no shafts revolve in the drums, allowing both to stop immediately after their function is performed. The complete shovel unit when assembled ready for use weighs only 15 tons.

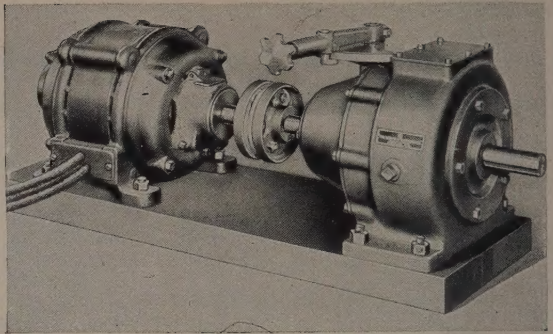
Atlas Accordion-Fold Cap in Handy Package

The Atlas Powder Co., Wilmington, Del., has developed a new Atlas "Accordion Fold" electric blasting cap



The accordion fold which allows use of compact package and eliminates kinking.

which is said to set a new standard of safety and ease of handling. In this cap the wires are folded accordion-wise and the folds laid around the blasting cap in such a manner as to protect and cushion it on all sides against mechanical shock. The round paper tube which encloses the cap is indented around its circumference at the middle so that a simple pressure of the fingers opens the package along the indented line. The wire is then easily extended to any desired length without danger of kinking or the cap end can be straightened for priming without disturbing the remainder of the wire. The regular Atlas metal safety shunt and the insulated match head are used to give protection from stray electric currents.



The Johnson variable speed-reducer.

Variable Reducer Has Infinite Speed Control

The Smith Power Transmission Co., Cleveland, O., has developed the Johnson variable reducer which is designed to meet the needs for a wide variety of industries. This unit is an infinite variable speed reducer, self contained and compact, and running in a bath of oil. It has infinite speed control from zero to any desired speed with a control that is visible and quickly manipulated. It is said to have a stopping position that is superior to a clutch as the unit stops instantly, having no inertia to overcome, and is noiseless in operation. This reducer is strictly a mechanical device and does not operate under rolling or sliding friction. The capacity of the unit ranges from 1 hp. up.

Asphalt Plant Mfrs. Assn. Meets to Adopt New Code

The Asphalt Plant Manufacturers Ass'n. met at the William Penn Hotel, Pittsburgh, Pa., on Aug. 30 to adopt a code of fair competition which had been formulated at a previous meeting held in Philadelphia on Aug. 12. J. H. Flynn, manager of the Asphalt Plant Division of the Blaw-Knox Co., was temporary chairman. Other members of this association are:

Barber Asphalt Co., Philadelphia, Pa., Ralph C. Heath, Mgr., Streets and Road Dept.
Bituminous Road Machinery Co., Wayne, Pa., T. H. Morris, Mgr.
Coatesville Boiler Wks., Middletown, Pa., R. A. Locke, Gen. Mgr.
F. D. Cummer & Son Co., Cleveland, O., I. Freeman, Vice-Pres.
J. D. Farasey Mfg. Co., Cleveland, O., James Farasey, Pres.
Hetherington & Berner, Indianapolis, Ind., Robert Berner, Pres.
Iowa Mfg. Co., Cedar Rapids, Ia., Howard Hall, Pres.
Madsen Iron Wks., Los Angeles, Cal., Martin Madsen, Pres.
Simplicity System Co., Chattanooga, Tenn., Larry B. West.
Standard Steel Wks., Los Angeles, Cal., Geo. J. Kuhrts, Jr., Pres.
Warren Bros. Road Co., Boston, Mass., W. B. Slemmer, Vice-Pres.

Manufacturers of construction machinery met with the National Recovery Administration in Washington on Sept. 28 for a final hearing on the code submitted by these industries.